Thecus 1U4500R
1U4500S

User's Manual

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About This Manual

All information in this manual has been carefully verified to ensure its correctness. In case of an error, please provide us with your feedback. Thecus Technology Corporation reserves the right to modify the contents of this manual without notice.

Product name: Thecus 1U4500
Manual Version: 1.1
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Limited Warranty

Thecus Technology Corporation guarantees all components of Thecus 1U4500 are thoroughly tested before they leave the factory and should function normally under general usage. In case of any system malfunctions, Thecus Technology Corporation and its local representatives and dealers are responsible for repair without cost to the customer if the product fails within the warranty period and under normal usage. Thecus Technology Corporation is not responsible for any damage or loss of data deemed to be caused by its products. It is highly recommended that users conduct necessary back-up practices.

Safety Warnings

For your safety, please read and follow the following safety warnings:

- Read this manual thoroughly before attempting to set up your 1U4500.
- Your 1U4500 is a complicated electronic device. DO NOT attempt to repair it under any circumstances. In the case of malfunction, turn off the power immediately and have it repaired at a qualified service center. Contact your vendor for details.
- DO NOT allow anything to rest on the power cord and DO NOT place the power cord in an area where it can be stepped on. Carefully place connecting cables to avoid stepping or tripping on them.
- Your 1U4500 can operate normally under temperatures between 0°C and 40°C, with relative humidity of 20% – 85%. Using the 1U4500 under extreme environmental conditions could damage the unit.
- Ensure that the 1U4500 is provided with the correct supply voltage (AC 100V ~ 240V, 50/60 Hz, 3A). Plugging the 1U4500 to an incorrect power source could damage the unit.
- Do NOT expose the 1U4500 to dampness, dust, or corrosive liquids.
- Do NOT place the 1U4500 on any uneven surfaces.
- DO NOT place the 1U4500 in direct sunlight or expose it to other heat sources.
- DO NOT use chemicals or aerosols to clean the 1U4500. Unplug the power cord and all connected cables before cleaning.
- DO NOT place any objects on the 1U4500 or obstruct its ventilation slots to avoid overheating the unit.
- Keep packaging out of the reach of children.
- If disposing of the device, please follow your local regulations for the safe disposal of electronic products to protect the environment.

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Chapter 1: Introduction

Overview

Thank you for choosing the Thecus 1U4500 1U Rackmount Storage Server. The Thecus 1U4500 is an easy-to-use storage server that allows a dedicated approach to storing and distributing data on a network. Data reliability is ensured with RAID features that provide data security and recovery—over one Terabyte of storage is available using RAID 5 and RAID 6. Gigabit Ethernet ports enhance network efficiency, allowing the 1U4500 to take over file management functions, increase application and data sharing and provide faster data response. The 1U4500 offers data mobility with a disk roaming feature that lets you hot swap working hard drives for use in another 1U4500, securing the continuity of data in the event of hardware failure. The 1U4500 allows data consolidation and sharing between Windows (SMB/CIFS), UNIX/Linux, and Apple OS X environments, and its user-friendly GUI supports multiple languages. Take the time now to read through this user's manual and get the most out of your 1U4500.

Product Highlights

File Server

First and foremost, the 1U4500 allows you to store and share files over an IP network. With a Network Attached Storage (NAS) device, you can centralize your files and share them easily over your network. With the easy-to-use web-based interface, users on your network can access these files in a snap.

To learn about the Web User Interface, go to **Chapter 6: Using the 1U4500 > Using WebDisk**.

FTP Server

With the built-in FTP Server, friends, clients, and customers can upload and download files to your 1U4500 over the Internet with their favorite FTP programs. You can create user accounts so that only authorized users have access.

To set up the FTP Server, refer to **Chapter 5: Additional Feature Setup > FTP Server**.

Backup Server

Don't leave precious data to chance. With advanced backup capabilities, you can easily upload mission critical files to the 1U4500, and even automate your backup tasks for true peace-of-mind.

To find out how to backup your files with the 1U4500, refer to **Chapter 6: Using the 1U4500 > File Backup**.

Printer Server

With the 1U4500's Printer Server, you can easily share an IPP printer with other PCs connected to your network.

To set up the Printer Server, refer to **Chapter 5: Additional Feature Setup > Printer Server**.

Redundant Power Supply (1U4500R)

The redundant power supply included with the 1U4500R ensures maximum uptime in the event of a failure of one of the power supplies. This is recommended for systems that require a high degree of fault tolerance.

Package Contents

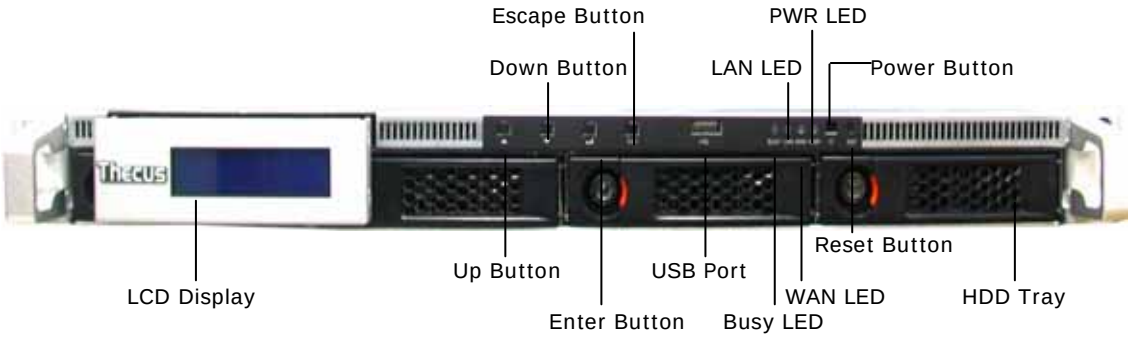
Your 1U4500 package should contain the following items:

- QIG
- CD-Title
- Ethernet Cable
- USB2.0 Cable Accessory
- Screw Kit

Please check to see if your package is complete. If you find that some items are missing, contact your dealer.

Front Panel

The 1U4500's front panel displays the unit's array of status LEDs, controls, USB port, and LCD display. See the table below for a detailed explanation of each:



Front Panel	
Item	**Description**
WAN LED	• **Solid green:** network link • **Blinking green:** network activity
LAN LED	• **Solid green:** network link • **Blinking green:** network activity
Busy LED	• **Blinking orange:** system startup or system maintenance; data currently inaccessible
USB Port	• USB 2.0 port for compatible USB devices, such as digital cameras, USB disks, and USB printers
Power Button	• Power on/off 1U4500 • **Solid blue:** Device is powered on • **Blinking blue:** eSATA hard disk is connected and active
Reset Button	• Resets the 1U4500 • Press for five seconds during boot process to reset IP address and admin password
HDD Trays	• Four 3.5" SATA HDD trays • Locks are provided for added security
LCD Display	• Displays current system status and warning messages • Displays hostname, WAN/LAN IP address, RAID status, and current time
Up Button ▲	• Push to scroll up when using the LCD display
Down Button ▼	• Push to scroll down when using the LCD display
Enter Button ↵	• Push to confirm information entered into the LCD display
Escape Button **ESC**	• Push to leave the current LCD menu

Hard Disk Trays

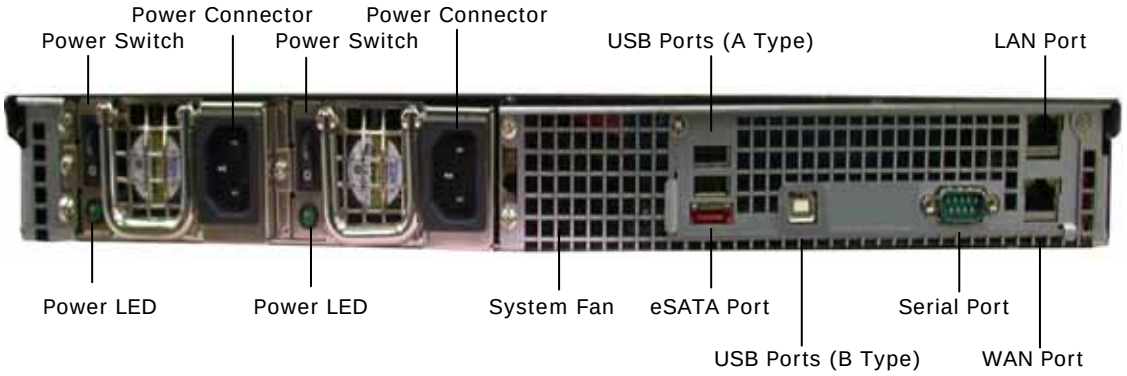
Each of the 1U4500's hard disk trays has a lock, a latch, and two LED indicators:

Hard Disk Trays	
Item	**Description**
Lock	• Use the lock to physically secure the hard disk to the unit
Latch	• Use to open and remove or close and secure the tray
HDD Power LED	• **Solid blue:** hard disk is powered on
HDD Access/Error LED	• **Blinking green:** system is accessing data on the hard disk • **Blinking red:** a hard disk error has occurred

Rear Panel

1U4500R

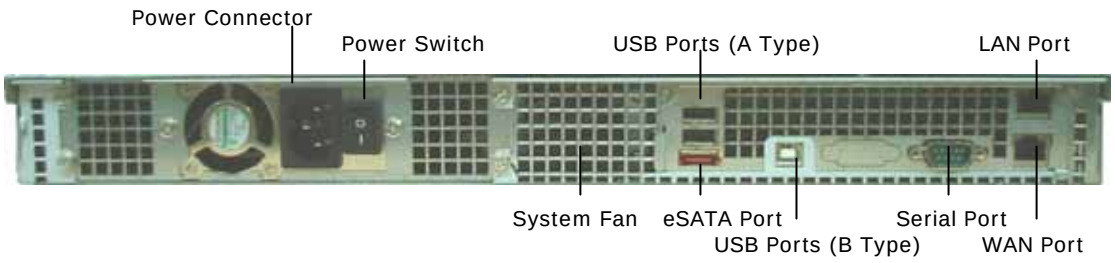
The rear panel of the 1U4500R houses most of the USB and Ethernet connections, as well as the eSATA port, system fan, and power connector. See the table below for descriptions of each:



1U4500 Back Panel	
Item	**Description**
eSATA Port	• eSATA port for high-speed storage expansion
USB Ports	• USB 2.0 ports for compatible USB devices, such as digital cameras, USB disks, and USB printers
WAN Port	• WAN port for connecting to an Ethernet network through a switch or router
LAN Port	• LAN port that can be used for connection sharing
Power Switch	• Switch for power supply
System Fan	• System fan that exhausts heat from the unit
Serial Port	• This port is for factory use only
Power Connector s	• Connect the included power cords to these connectors

1U4500S

The rear panel of the 1U4500S is similar to the 1U4500R, but with a single power connector:



Chapter 2: Hardware Installation

Overview

Your 1U4500 is designed for easy installation. To help you get started, the following chapter will help you quickly get your 1U4500 up and running. Please read it carefully to prevent damaging your unit during installation.

Before You Begin

Before you begin, be sure to take the following precautions:

1. Read and understand the ***Safety Warnings*** outlined in the beginning of the manual.

2. If possible, wear an anti-static wrist strap during installation to prevent static discharge from damaging the sensitive electronic components on the 1U4500.

3. Be careful not to use magnetized screwdrivers around the 1U4500's electronic components.

Hard Disk Installation

The 1U4500 supports four standard 3.5" Serial ATA (SATA) hard disks. To install a hard disk into the 1U4500, follow the steps below:

1. Remove a hard disk tray from the 1U4500.

2. Slide the new SATA hard disk into the tray and fasten the screws.

3. Insert the hard disk and tray back into the 1U4500 until it snaps into place and lock it with a key if desired.

4. The LED blinks green when the hard disk is accessed. If the Error LED flashes red it signals a problem.

NOTE *If your HDD was part of a RAID 1 or 5 array previously, it automatically rebuilds. If you replace all the drives with higher capacity drives, you need to go to Administrator login and format the drives.*

Cable Connections

To connect the 1U4500 to your network, follow the steps below:

1. Connect an Ethernet cable from your network to the WAN port on the back panel of the 1U4500.

2. Connect the provided power cord into the universal power socket on the back panel. Plug the other end of the cord into a surge protector socket. Press the power supply switch to turn on the power supply.

NOTE *If you are installing the 1U4500R, be sure to connect both power cables. If you do not, the system will assume one power supply has failed, and an alarm will sound. For more information, refer to Chapter 8: Troubleshooting.*

3. Press the power button on the Front Panel to boot up the 1U4500.

Checking System Status

After making connections on the 1U4500 and powering up, check whether the system status is normal or has trouble by observing indicators on the front panel and hard disk trays.

System Status Normal

The system status is normal if:

1. The WAN and LAN LEDs glow green (assuming both are connected).
2. The Power LED on the Front Panel glows blue.
3. The HDD Power LED on each HDD tray glows blue (assuming all disks are installed).
4. The default IP address of the WAN port is 192.168.1.100.

Chapter 3: First Time Setup

Overview

Once the hardware is installed, physically connected to your network, and powered on, you can configure the 1U4500 so that it is accessible to your network users. There are two ways to set up your 1U4500: using the **Thecus Setup Wizard** or the **LCD display**. Follow the steps below for initial software setup.

Thecus Setup Wizard

The handy Thecus Setup Wizard makes configuring 1U4500 a snap. To configure the 1U4500 using the Setup Wizard, perform the following steps:

1. Insert the installation CD into your CD-ROM drive (the host PC must be connected to the network).

2. The Setup Wizard should launch automatically. If not, please browse your CD-ROM drive and double click on **Setup.exe.**

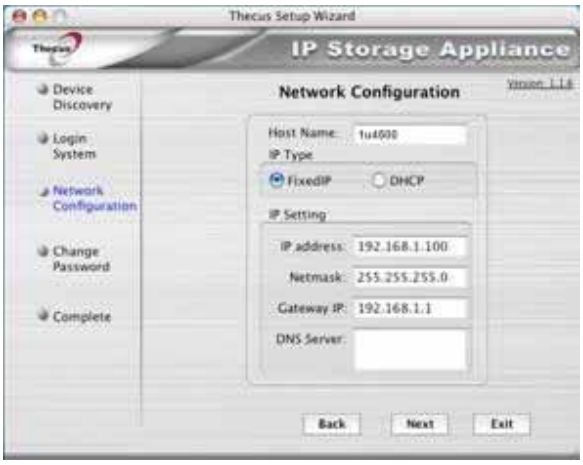
NOTE For MAC OS X users, double click on Thecus Setup Wizard 1.1.6.dmg

3. The Setup Wizard will start and automatically detect all Thecus storage devices on your network. If none are found, please check your connection and refer to **Chapter 8: Troubleshooting** for assistance.

4. Select the 1U4500 that you like to configure.

5. Login with the administrator account and password. The default account and password are both “admin”.

6. Name your 1U4500 and configure the network IP address. If your switch or router is configured as a DHCP Server, configuring the 1U4500 to automatically obtain an IP address is recommended. You may also use a static IP address and enter the DNS Server address manually.



7. Change the default administrator password.

8. Finished! Access the 1U4500 Web Administrator Interface by pressing the ***Start Browser*** button. You can also configure another 1U4500 at this point by clicking the ***Setup Other Device*** button. Press ***Exit*** to exit the wizard.

NOTE

The Thecus Setup Wizard is designed for installation on systems running Windows XP/2000 or Mac OSX or later. Users with other operating systems will need to install the Thecus Setup Wizard on a host machine with one of these operating systems before using the unit.

LCD Operation

The 1U4500 is equipped with an LCD on the front for easy status display and setup. There are four buttons on the front panel to control the LCD functions.

LCD Controls

Use the **Up** (▲), **Down** (▼), **Enter** (↵) and **Escape** (**ESC**) keys to select various configuration settings and menu options for 1U4500 configuration.

The following table illustrates the keys on the front control panel:

LCD Controls		
Icon	**Function**	**Description**
▲	Up Button	Select the previous configuration settings option.
▼	Down Button	Select the next configuration settings option.
↵	Enter	Enter the selected menu option, sub-menu, or parameter setting.
ESC	Escape	Escape and return to the previous menu.

There are two modes of operation for the LCD: **Display Mode** and **Management Mode**.

Display Mode

During normal operation, the LCD will be in **Display Mode**.

Display Mode	
Item	**Description**
Host Name	Current host name of the system.
WAN	Current WAN IP setting.
LAN	Current LAN IP setting.
Link Aggregation	Current Link Aggregation status (1U4500B PRO only)
Disk Info	Current status of disk slot has been installedh
RAID	Current RAID status.
System Fan	Current system fan status.
94BCPU Fan	Current CPU fan status
2006/06/16 12:00	Current system time.

The 1U4500 will rotate these messages every one-two seconds on the LCD display.

USB Copy

The USB Copy function enables you to copy files stored on USB devices such as USB disks and digital cameras to the 1U4500 with a press of a button. To use USB copy, follow the steps below:

1. Plug your USB device into an available USB port on the Front Panel.
2. In **Display Mode**, press the **Down Button** (▼).
3. The LCD will display "**USB Copy?**"
4. Press **Enter** (↵) and the 1U4500 will start copying USB disks connected to the front USB port.
5. All of data will be copied into system folder named "USBcopy".

Management Mode

During setup and configuration, the LCD will be in **Management Mode**.

To enter into Management Mode, press **Enter (↵)** and an "*Enter Password*" prompt will show on the LCD.

At this time, the administrator has to enter the correct LCD password. System will check whether the correct LCD password has been entered. The default LCD password is "0000". If correct password is entered, you will enter into the **Management Mode** menu.

Management Mode	
Item	**Description**
WAN Setting	IP address and netmask of your WAN ports.
LAN Setting	IP address and netmask of your LAN ports.
Link Agg. Setting	Select **Load Balance** or **Failover**.
Change Admin Passwd	Change administrator's password for LCD operation.
Reset to Default	Reset system to factory defaults.
Exit	Exit **Management Mode** and return to **Display Mode**.

NOTE

You can also change your LCD password using the Web Administration Interface by navigating to **System** > **Administrator Password**. For more on the Web Administration Interface, see **Chapter 4: System Management**.

Typical Setup Procedure

From the Web Administration Interface, you can begin to setup your 1U4500 for use on your network. Setting up the 1U4500 typically follows the five steps outlined below.

For more on how to use the Web Administration Interface, see **Chapter 4: System Management > Web Administration Interface**.

Step 1: Network Setup

From the Web Administration Interface, you can configure the network settings of the 1U4500 for your network. You can access the **Network** menu from the menu bar.
For details on how to configure your network settings, refer to **Chapter 4: System Management > Network Management**.

Step 2: RAID Creation

Next, administrators can configure their preferred RAID setting and build their RAID volume. You can access RAID settings from the menu bar of the Web Administration Interface by navigating to ***Storage > RAID.***

For more information on configuring RAID, see **Chapter 4: System Management > RAID Configuration**.

Don't know which RAID level to use? Find out more about the different RAID levels from **Appendix C: RAID Basics**.

Step 3: Create Local Users or Setup Authentication

Once the RAID is ready, you can begin to create local users for the 1U4500, or choose to setup authentication protocols such as Active Directory (AD).

For more on managing users, go to **Chapter 4: System Management > User and Group Management**.

For more information on configuring Active Directory, see **Chapter 4: System Management > User and Group Management > ADS/NT Configuration**.

For information about the benefits of Active Directory, see **Appendix D: Active Directory Basics**.

Step 4: Create Folders and Set Up ACLs

Once users are introduced into your network, you can begin to create various folders on the 1U4500 and control user access to each using Folder Access Control Lists.

More information on managing folders, see **Chapter 4: System Management > Folder Management**.

To find out about configuring Folder Access Control Lists, see **Chapter 4: System Management > Folder Management > Folder Access Control List (ACL)**.

Step 5: Start Services

Finally, you can start to setup the different services of the 1U4500 for the users on your network. You can find out more about each of these services by clicking below:

SMB/CIFS

Apple File Protocol (AFP)

Network File System (NFS)

File Transfer Protocol (FTP)

Printer Server

Chapter 4: System Management

Overview

The 1U4500 provides an easily accessible **Web Administration Interface**. With it, you can configure and monitor the 1U4500 anywhere on the network.

Web Administration Interface

Make sure your network is connected to the Internet. To access the 1U4500 **Web Administration Interface**:

1. Type the 1U4500's IP address into your browser. (Default IP address is `http://192.168.1.100`)

NOTE Your computer's network IP address must be on the same subnet as the 1U4500. If the 1U4500 has default IP address of 192.168.1.100, your managing PC IP address must be 192.168.1.x, where x is a number between 1 and 254, but not *100*.

2. Login to the system using the administrator user name and password. The factory defaults are:

   User Name: `admin`
   Password: `admin`

   If you changed your password in the setup wizard, use the new password.

Once you are logged in as an administrator, you will see the **Web Administration Interface**. From here, you can configure and monitor virtually every aspect of the 1U4500 from anywhere on the network.

Menu Bar

The **Menu Bar** is where you will find all of the information screens and system settings of the 1U4500. The various settings are placed in the following groups on the menu bar:

Menu Bar	
Item	**Description**
Status	Current system status of the 1U4500.
Storage	Information and settings for storage devices installed into the

	1U4500.
Network	Information and settings for network connections, as well as various services of the 1U4500.
Accounts	Allows configuration of users and groups.
System	Various 1U4500 system settings and information.
Language	Choose your preferred language here.

Moving your cursor over any of these items will display the dropdown menu selections for each group.

In the following sections, you will find detailed explanations of each function, and how to configure your 1U4500.

Language Selection

The 1U4500 supports multiple languages, including:

- English
- French
- German
- Italian
- Traditional Chinese
- Simplified Chinese
- Japanese
- Korean
- Spanish

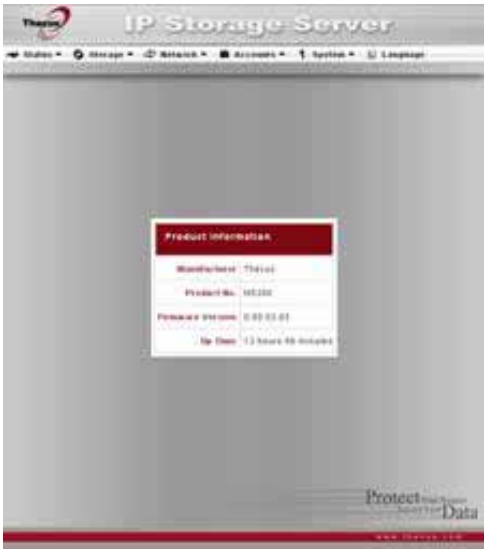
On the menu bar, click ***Language*** and the **Change Language** screen appears. This screen allows you to select preferred language for the 1U4500. Press ***Apply*** to confirm your selection.

Status Menu

The **Status** Menu on the menu bar allows you to see various aspects of the 1U4500. From here, you can discover the status of the 1U4500, and even find out other details like firmware version and up time.

Product Information

Once you login, you will first see the basic **Product Information** screen providing **Manufacturer**, **Product No.**, **Firmware Version**, and **Up Time** information.

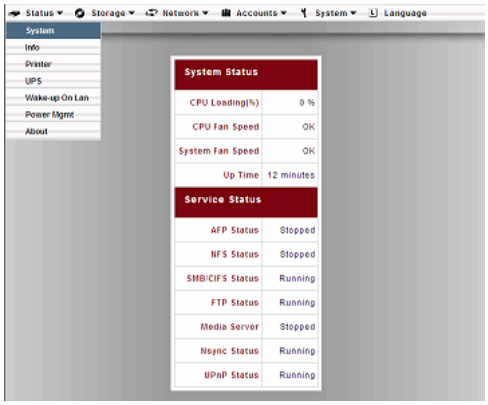


Product Information	
Item	**Description**
Manufacturer	Displays the name of the system manufacturer.
Product No.	Shows the model number of the system.
Firmware version	Shows the current firmware version.
Up time	Displays the total run time of the system.

To access this screen again, navigate to ***Status*** > ***About***.

System/Service Status

From the **Status** menu, choose the ***System*** item, and the **System Status** and **Service Status** screens appear. These screens provide basic system and service status information.



System Status	
Item	**Description**
CPU Loading (%)	Displays current CPU workload of the 1U4500.
CPU Fan Speed	Displays current CPU fan status.
System Fan Speed	Displays the current status of the system fan.
Up Time	Shows how long the system has been running.

Service Status

Item	Description
AFP Status	The status of the Apple Filing Protocol server.
NFS Status	The status of the Network File Service Server.
SMB/CIFS Status	The status of the SMB/CIFS server.
FTP Status	The status of the FTP server.
Media Server	The status of the Media Server
Nsync Status	The status of the Nsync server.
UPnP Status	The status of the UPnP service.

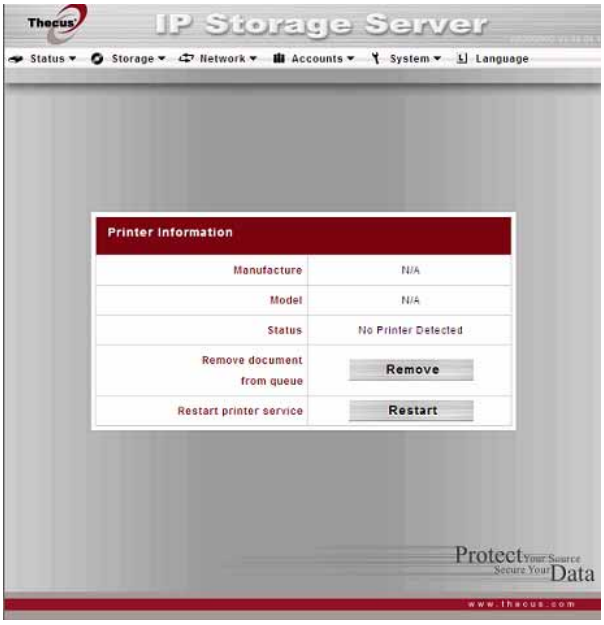
System Information

From **Status** menu, choose the ***Info*** item, and the **System Information** screen appears. You can change the system information that appears on the Login page by entering the new information here and pressing ***Apply*** to confirm.

System Information	
Item	**Description**
System Description	Shows the system description that would also appear on the Login page.

Printer Status

From the **Status** menu, choose the ***Printer*** item, and the **Printer Information** screen appears. This screen provides the following information about the USB printer connected to the USB port.



Printer Status	
Item	**Description**
Manufacturer	Displays the name of the USB printer manufacturer.
Model	Displays the model of the USB printer.

Status	Displays the status of the USB printer.
Remove document from Queue	Click to remove all documents from printer queue
Restart Printer service	Click to restart printer service

If a corrupt print job is sent to a printer, printing may suddenly fail. If your print jobs seem to be locked up, pressing the ***Remove All Documents*** button to clear the print queue may resolve the issue.

For information on how to set up the Printer Server, refer to **Chapter 5: Additional Feature Setup > Printer Server**.

UPS Settings

The 1U4500 can also support various uninterruptible power supply units, providing extra data security and accessibility in the case of a power failure.

From the **Status** menu, choose the ***UPS*** item and the **UPS Setting** screen appears. Make any changes you wish, and press ***Apply*** to confirm changes. See the following table for a detailed description of each item.

UPS Settings	
Item	**Description**
UPS Monitoring	Enable or disable UPS monitoring.
Manufacturer	Choose the UPS manufacturer and model number from the dropdowns.
Battery Status	Current status of the UPS battery
Power	Current status of the power being supplied to the UPS
Seconds between power failure and first notification	Delay between power failure and first notification in seconds.
Seconds between subsequent power failure notifications	Delay between subsequent notifications in seconds.
Shutdown the system when the battery charge is less than	Amount of UPS battery remaining before system should auto-shutdown.
Apply	Press ***Apply*** to save your changes.

For a list of supported UPS units, see **Appendix E: UPS Compatibility List**.

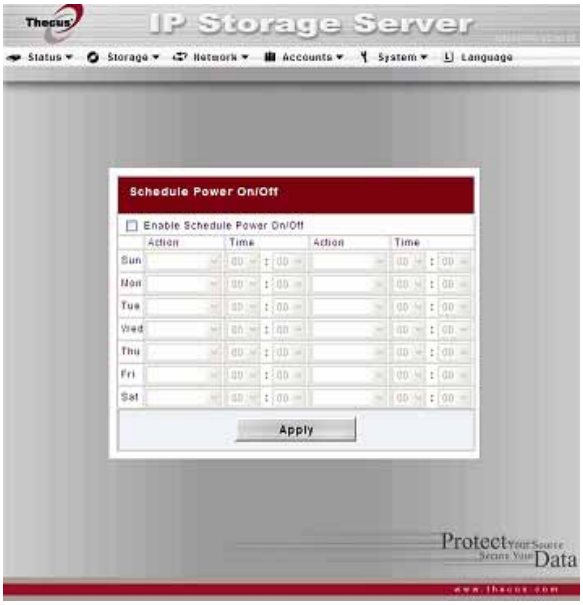
Wake-Up On Lan (WOL)

The 1U4500 has the ability to be awoken from sleep mode via WAN port.

From the **Status** menu, choose the ***WOL*** item, and the **Wake-up On Lan Configuration** screen appears. From here, you can **Enable** or **Disable**.

Wake-up On Lan Configuration	
Item	**Description**
WOL Servic	**Enable** or **Disable** WOL service
Apply	Click ***Apply*** to save changes.

Power Management



Using the 1U4500's Power Management, you can save energy and money by scheduling the 1U4500 to turn itself on and off during certain times of the day.

From the **Status** menu, choose the ***Power Mgmt*** item and the **Schedule Power On/Off** screen appears.

To designate a schedule for the 1U4500 to turn on and off, first enable the feature by checking the **Enable Schedule Power On/Off** checkbox.

Then, simply choose an on and off time for each day of the week that you would like to designate a schedule by using the various dropdowns.

Finally, click ***Apply*** to save your changes.

Example - Monday: On: 8:00; Off: 16:00
System will turn on at 8:00 AM on Monday, and off at 16:00 on Monday. System will turn on for the rest of the week.

If you choose an on time, but do not assign an off time, the system will turn on and remain on until a scheduled off time is reached, or if the unit is shutdown manually.

Example - Monday: On: 8:00
System will turn on at 8:00 AM on Monday, and will not shut down unless powered down manually.

You may also choose two on times or two off times on a particular day, and the system will act accordingly.

Example - Monday: Off: 8:00; Off: 16:00
System will turn off at 8:00 AM on Monday. System will turn off at 16:00 PM on Monday, if it was on. If the system was already off at 16:00 PM on Monday, system will stay off.

Storage Management

The **Storage Menu** displays the status of storage devices installed in the 1U4500, and includes storage configuration options such as RAID and disk settings, folder configuration, and Nsync settings.

Disks Information

From the **Storage** menu, choose the ***Disks*** item and the **Disks Information** screen appears. From here, you can see various items about installed SATA hard disks. Blank lines indicate that a SATA hard disk is not currently installed in that particular disk slot.

Disks Information	
Item	**Description**
Disk No.	Indicates disk location.
Capacity	Shows the SATA hard disk capacity.
Model	Displays the SATA hard disk model name.
Firmware	Shows the SATA hard disk firmware version.
Status	Indicates the status of the disk. Can read **OK**, **Warning**, or **Failed**.
Total Capacity	Shows the total SATA hard disk capacity.
Disk Power Management	The administrator can set the disk to power down after a period of inactivity.

NOTE When the Status shows Warning, it usually means there are bad sectors on the hard disk. It is shown only as a precaution and you should consider changing the drives.

S.M.A.R.T. Information

On the **Disks Information** screen, the status of each disk will be displayed in the **Status** column. Clicking on an ***OK*** or ***Warning*** link will display the **S.M.A.R.T Information** window for that particular disk.

S.M.A.R.T. Information	
Item	**Description**
Tray Number	Tray the hard disk is installed in.
Model	Model name of the installed hard disk.
Power ON Hours	Count of hours in power-on state. The raw value of this attribute shows total count of hours (or minutes, or seconds, depending on manufacturer) in power-on state.
Temperature Celsius	The current temperature of the hard disk in degrees Celsius
Reallocated Sector Count	Count of reallocated sectors. When the hard drive finds a read/write/verification error, it marks this sector as "reallocated" and transfers data to a special reserved area (spare area). This process is also known as remapping and "reallocated" sectors are called remaps. This is why, on a modern hard disks, you can not see "bad blocks" while testing the surface - all bad blocks are hidden in reallocated sectors. However, the more sectors that are reallocated, the more a decrease (up to 10% or more) can be noticed in disk read/write speeds.
Current Pending Sector	Current count of unstable sectors (waiting for remapping). The raw value of this attribute indicates the total number of sectors waiting for remapping. Later, when some of these sectors are read successfully, the value is decreased. If errors still occur when reading sectors, the hard drive will try to restore the data, transfer it to the reserved disk area (spare area), and mark this sector as remapped. If this attribute value remains at zero, it indicates that the quality of the corresponding surface area is low.
Raw Read Error Rate	This attribute value depends on read errors and disk surface condition, and indicates the rate of hardware read errors that occurred when reading data from a disk surface. Lower values indicate that there is a problem with either the disk surface or the read/write heads.
Seek Error Rate	Rate of seek errors by the magnetic heads. If there is a failure in the mechanical positioning system, servo damage or a thermal widening of the hard disk, seek errors arise. More seek errors indicates a worsening condition of a disk surface and the disk mechanical subsystem.
Back	Press ***Back*** to go back to the **Disks Information** screen.

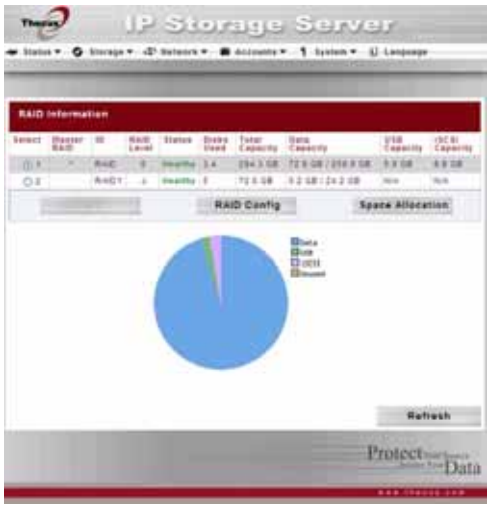
NOTE

If the Reallocated Sector Count or Current Pending Sector of a hard disk drive is not zero, the status of the disk will show “Warning”. This warning is only used to alert the system administrator that there are bad sectors on the disk, and they should replace those disks as soon as possible.

RAID Information

From the **Storage** menu, choose the ***RAID*** item and the **RAID List** screen appears.

This screen lists the RAID volumes currently residing on the 1U4500. From this screen, you can get information about the status of your RAID volumes, as well as the capacities allocated for data, USB target, and iSCSI. There is also a graph which represents how the RAID volume is currently allocated.



To configure your RAID settings, press the ***RAID Config*** button to go to the **RAID Configuration** screen.

RAID Information	
Item	**Description**
Select	Used to select the current RAID volume.
Master RAID	The RAID volume currently designated as the Master RAID volume.
ID	ID of the current RAID volume. **NOTE: All RAID IDs must be unique.**
RAID Level	Shows the current RAID configuration.
Status	Indicates status of the RAID. Can read either ***Healthy***, ***Degraded***, or ***Damaged***.
Disks Used	Hard disks used to form the current RAID volume.
Total Capacity	Total capacity of the current RAID.
Data Capacity	Indicates the used capacity and total capacity used by user data.
USB Capacity	Indicates the capacity allocated to USB target mode.
iSCSI Capacity	Indicates the capacity allocated to iSCSI.
RAID Config	Press this to configure RAID volumes.
Space Allocation	Press this to adjust the space allocated for data, USB target mode, and iSCSI.

RAID Configuration

On the **RAID List** screen, press the ***RAID Config*** button to go to the **RAID Configuration** screen. In addition to RAID disk information and status, this screen lets you make RAID configuration settings.

For more information on RAID, see **Appendix C: RAID Basics**.

RAID Level

You can set the storage volume as **JBOD**, **RAID 0**, **RAID 1**, **RAID 5, RAID 6 or RAID 10**. RAID configuration is usually required only when you first set up the device. A brief description of each RAID setting follows:

RAID Levels	
Level	**Description**
JBOD	The storage volume is a single HDD with no RAID support. JBOD requires a minimum of 1 disk.
RAID 0	Provides data striping but no redundancy. Improves performance but not data safety. RAID 0 requires a minimum of 2 disks.
RAID 1	Offers disk mirroring. Provides twice the read rate of single disks, but same write rate. RAID 1 requires a minimum of 2 disks.
RAID 5	Data striping and stripe error correction information provided. RAID 5 requires a minimum of 3 disks. RAID 5 can sustain one failed disk.

RAID 6	Two independent parity computations must be used in order to provide protection against double disk failure. Two different algorithms are employed to achieve this purpose. RAID 6 requires a minimum of 4 disks. RAID 6 can sustain two failed disks.
RAID 10	RAID 10 has high reliability and high performance. RAID 10 is implemented as a striped array whose segments are RAID 1 arrays. It has the fault tolerance of RAID 1 and the performance of RAID 0. RAID 10 requires 4 disks. RAID 10 can sustain two failed disks.

WARNING If the administrator improperly removes a hard disk that should not be removed when RAID status is Degraded, all data will be lost.

RAID Settings

Using **RAID Settings**, you can select stripe size, choose which disks are RAID disks or the Spare Disk, as well as enter a name for each disk.

RAID Settings	
Item	**Description**
RAID	Check the boxes of the hard drives you wish to add to the storage volume.
Master RAID	Check a box to designate this as the Master RAID volume. See the **NOTE** below for more information.
Disk No.	Number assigned to the installed hard disks.
Capacity (MB)	Capacity of the installed hard disks.
Model	Model number of the installed hard disks.
Status	Status of the installed hard disks.
Member	If this is checked, current hard disk is a part of a RAID volume.
Spare	If this is checked, current hard disk is designated as a spare for a RAID volume.
Stripe Size	This sets the stripe size to maximize performance of sequential files in a storage volume. Keep the 64K setting unless you require a special file storage layout in the storage volume. A larger stripe size is better for large files.
Used Percentage	The percentage of the RAID volume that will be used to store data.
Apply	Press this button to configure a file system and create the RAID storage volume.
Remove	Click to remove the RAID volume. All user data, iSCSI, and Target USB data will be removed.
Back	Press this button to exit without saving changes.
Expand	Press this button to configure a file system and create the RAID storage volume.
Migration	Press this button to migrate RAID level.

Creating a RAID

To create a RAID volume, follow the steps below:

1. On the **RAID List** screen, click ***New***.

2. On the **RAID Configuration** screen, set the RAID storage space as **JBOD**, **RAID 0**, **RAID 1**, **RAID 5**, **RAID 6**, or **RAID 10** — see **Appendix C: RAID Basics** for a detailed description of each.

3. Specify a RAID ID.

4. If this RAID volume is meant to be the Master RAID volume, tick the **Master RAID** checkbox.

NOTE

In a multiple RAID configuration, one RAID volume must be designated as the Master RAID volume. The Master RAID volume will store all installed modules. If the Master RAID is changed to another location (i.e. assigning HDD 2 to be the Master RAID volume after HDD 1 had been previously assigned), then all modules must be reinstalled. In addition, all system folders that were contained on the Master RAID volume will be invisible. Reassigning this volume to be the Master RAID will make these folders visible again.

5. Tick the checkboxes under the "member" heading of the hard disks you wish to use to create a RAID.

6. Specify a stripe size — 64K is the default setting.

7. Specify the percentage allocated for user data. The remaining space will be made available for target USB, iSCSI target.

8. Press ***Apply*** to build the RAID storage volume.

NOTE

Building a RAID storage space may take time, depending on the size of hard drives and RAID mode.

WARNING

Creating RAID destroys all data in the current RAID volume. The data is unrecoverable.

With a RAID 1, RAID 5, RAID 6, or RAID 10 volume, you can also add a spare disk after the RAID is created. See **Chapter 7: Tips and Tricks > Adding a Spare Disk** for details.

Expanding a RAID

To expand a RAID 1, RAID 5, RAID 6, or RAID 10 volume, follow the steps below:

1. Replace one of the hard drives in the RAID volume and allow it to automatically rebuild.

2. Once rebuilt, you can continue to replace any remaining disks in the RAID array.

3. When you are done replacing hard drives, log on to Web Management. Navigate to **Storage** > ***RAID*** to open the **RAID List** screen.

4. On the **RAID List** screen, select the RAID volume by clicking on its radio button, and click ***RAID Config*** to open the **RAID Configuration** screen.

5. On the **RAID Configuration** screen, click ***Expand***.

Migrating a RAID

Once a RAID volume has been created, you may want to move it to other physical drives or change the RAID array all together. To migrate a RAID 0, RAID 1, or RAID 5 volume, follow the steps below:

1. From the RAID Configuration screen, click Migrate RAID.
2. A list of possible RAID migration configurations will be listed. Select the desired migration scheme and click OK.
3. The system will begin migrating the RAID volume.

NOTE Migrating a RAID volume could take several hours to complete

Below is a table listing of possible RAID migration schemes:

To➔ ↓ From	RAID 0	RAID 5
RAID 0	[RAID 0] HDDx2 to [RAID 0] HDDx3 [RAID 0] HDDx2 to [RAID 0] HDDx4 [RAID 0] HDDx2 to [RAID 0] HDDx5 [RAID 0] HDDx3 to [RAID 0] HDDx4 [RAID 0] HDDx3 to [RAID 0] HDDx5 [RAID 0] HDDx4 to [RAID 0] HDDx5	[RAID 0] HDDx2 to [RAID 5] HDDx3 [RAID 0] HDDx2 to [RAID 5] HDDx4 [RAID 0] HDDx2 to [RAID 5] HDDx5 [RAID 0] HDDx3 to [RAID 5] HDDx4 [RAID 0] HDDx3 to [RAID 5] HDDx5 [RAID 0] HDDx4 to [RAID 5] HDDx5
RAID 1	[RAID 1] HDDx2 to [RAID 0] HDDx2 [RAID 1] HDDx2 to [RAID 0] HDDx3 [RAID 1] HDDx2 to [RAID 0] HDDx4 [RAID 1] HDDx2 to [RAID 0] HDDx5	[RAID 1] HDDx2 to [RAID 5] HDDx3 [RAID 1] HDDx2 to [RAID 5] HDDx4 [RAID 1] HDDx2 to [RAID 5] HDDx5
RAID 5	**X**	[RAID 5] HDDx3 to [RAID 5] HDDx4 [RAID 5] HDDx3 to [RAID 5] HDDx5 [RAID 5] HDDx4 to [RAID 5] HDDx5

Deleting a RAID

To delete a RAID volume, follow the steps below:

1. On the RAID List screen, select the RAID volume by clicking on its radio button, and click ***RAID Config*** to open the **RAID Configuration** screen.
2. On the **RAID Configuration** screen, click ***Remove RAID***.
3. The confirmation screen appear, you will have to input “Yes” with exactly wording case to complete “**Remove RAID**” operation

WARNING Removing RAID destroys all data in the current RAID volume. The data is unrecoverable.

Space Allocation

You may specify the space allocated for both Target USB and iSCSI volumes.

To do this, under the **Storage** menu, click ***RAID*** and the **RAID List** window appears. Select the RAID volume you wish to reallocate by clicking on its radio button, and click ***Space Allocation***. The **RAID Information** and **Volume Allocation List** windows will appear.

The Volume Allocation List displays the space allocated for **Target USB** and **iSCSI** volumes on the current RAID volume. The 1U4500 supports up to **5** iSCSI volumes in each RAID volume.

Volume Allocation List	
Item	**Description**
Modify	Click this to modify the allocated space.
Del	Click this to delete the allocated space.
Type	Type of volume. Can be either USB or iSCSI.
Name	Name assigned to the volume.
Capacity	Capacity of the allocated space.
Target USB	Click to allocate space to Target USB volume.
iSCSI Target	Click to allocate space to iSCSI volume.

Allocating Space for Target USB Volume

To allocate space for a Target USB volume on the current RAID volume, follow the steps below:

1. Under the **Volume Allocation List**, click ***Target USB***.

   The **Create Target USB Volume** screen appears.

Create Target USB Volume	
Item	**Description**
RAID ID	ID of current RAID volume.
Unused	Percentage and amount of unused space on current RAID volume.
Allocation	Percentage and amount of space allocated to Target USB volume.
OK	Click ***OK*** to save changes.
Back	Click ***Back*** to exit without saving.

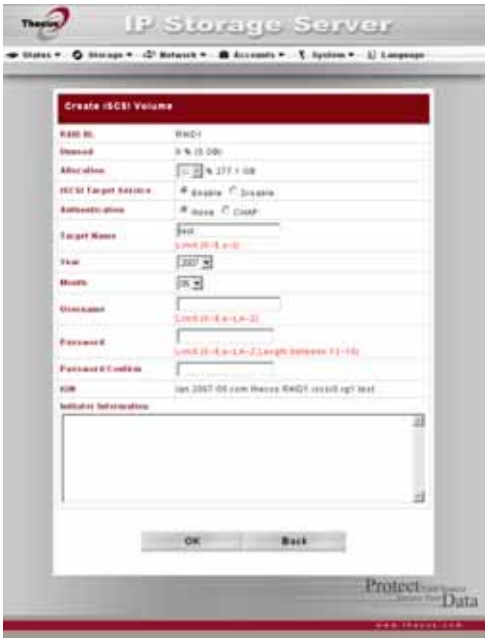
2. Designate the percentage that should be allocated to the Target USB volume by selecting the appropriate percentage from the **Allocation** dropdown.

3. Click ***OK*** to create the Target USB volume.

Allocating Space for iSCSI Volume

To allocate space for an iSCSI volume on the current RAID volume, follow the steps below:

1. Under the **Volume Allocation List**, click ***iSCSI Target***.



The **Create iSCSI Volume** screen appears.

Create iSCSI Volume	
Item	**Description**
RAID ID	ID of current RAID volume.
Unused	Percentage and amount of unused space on current RAID volume.
Allocation	Percentage and amount of space allocated to Target USB volume.
iSCSI Target Service	Enable or Disable the iSCSI Target service.
Authentication	You may choose CHAP authentication or choose None.
Target Name	Name of the iSCSI Target. This name will be used by the **Stackable NAS** function to identify this export share.
Year	Select the current year from the dropdown.
Month	Select the current month from the dropdown.
Username	Enter a username.
Password	Enter a password.
Password Confirm	Reenter the chosen password
IQN	The iSCSI Qualified Name
Initiator Information	Shows the name and status of iSCSI initiators logged on the system
OK	Click ***OK*** to save changes.
Back	Click ***Back*** to exit without saving.

2. Designate the percentage to be allocated from the **Allocation** dropdown.

3. Enable the **iSCSI Target Service** by selecting ***Enable***.

4. Choose to enable ***CHAP*** authentication or choose ***None***.

5. Enter a **Target Name**. This will be used by the **Stackable NAS** function to identify this export share.

6. Choose the current year from the **Year** dropdown.

7. Choose the current month from the **Month** dropdown.

8. If you've enabled CHAP authentication, enter a **username** and a **password**. Confirm your chosen password be reentering it in the **Password Confirm** box.

9. Click ***OK*** to create the iSCSI volume.

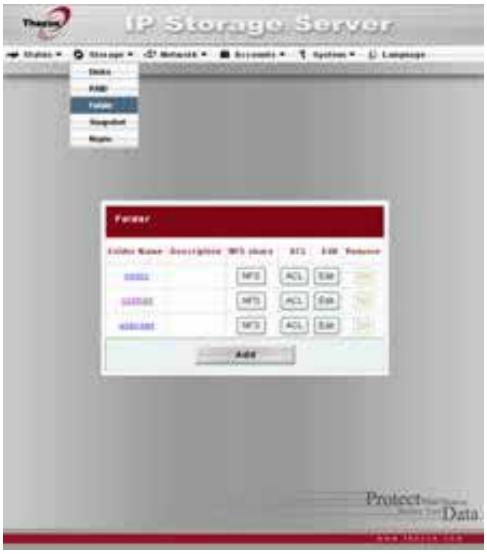
Stackable NAS

The 1U4500's capacity can be expanded even further using the stackable function. With it, users can expand the capacity of their network storage systems with up to 5 other stack target volumes which are located in different systems. These can be stacked through single network access like SMB or AFP acting as a share folder type.

For detailed instructions on how to use this feature, please refer to the **Stackable User Guide**.

Folder Management

From the **Storage** menu, choose ***Folder***, and the **Folder** screen appears. This screen allows you to create and configure folders on the 1U4500 volume.



Folder	
Item	**Description**
Folder name	Displays the name of the folder.
Description	Provides a description of the folder.
NFS Share	Press ***NFS Share*** to configure which hosts on the network are allowed to access this folder using NFS.
ACL	Press ***ACL*** (Access Control List) to configure which users have access to this folder.
Edit	Press ***Edit*** to enter the **Edit** screen and modify the folder's name and description.
Del	Press ***Del*** to delete the folder. A prompt appears asking to confirm the deletion.
Add	Press ***Add*** to enter the **Add Folder** screen.

NOTE Nsync folders will be created once the RAID is created. Nsync folder is used by Nsync server. It will be used for files backed up by Nsync.

Adding Folders

On the **Folder** screen, press the ***Add*** button and the **Add Folder** screen appears. This screen allows you to add a folder. After entering the information, press ***Apply*** to create new folder. Press ***Back*** to return to the **Folder** screen.

Add Folder	
Item	**Description**
RAID ID	RAID volume where the new folder will reside.
Folder Name	Enter the name of the folder.
Description	Provide a description the folder.
Browseable	Enable or disable users from browsing the folder contents. If **Yes** is selected, then the share folder will be browseable.
Public	Admit or deny public access to this folder. If **Yes** is selected, then users do not need to have access permission to write to this folder. When accessing a public folder via FTP, the behavior is similar to anonymous FTP. Anonymous users can upload/download a file to the folder, but they cannot delete a file from the folder.
Share Folder Limit	Enter the maximum size of the folder in Gigabytes (GB). The folder cannot grow beyond this limit. You can enter a 0 to turn off the share folder limit.
Apply	Press ***Apply*** to create the folder.
Back	Press ***Back*** to return to the **Folder** screen.

NOTE Folder names are limited to 60 characters. Systems running Windows 98 or earlier may not support file names longer than 15 characters.

Editing Folders

On the **Folder** screen, press the ***Edit*** button and the **Edit Folder** screen appears. This screen allows you to change folder information. After entering the information, press ***Submit*** to apply the changes. Press ***Back*** to return to the **Folder** screen.

Edit Folder	
Item	**Description**
Share Name	Enter the name of the (Share) folder.
Comment	Provide a description the folder.
Browseable	Enable or disable users from browsing the folder contents. This setting will only apply while access via SMB/CIFS and web disk.
Public	Admit or deny public access to this folder.
Share Limit	Enter the maximum size of the folder. The folder will not grow beyond this limit. You can enter a 0 to turn off the share folder limit.
Submit	Press ***Submit*** to save your changes.
Back	Press ***Back*** to return to the **Folder** screen.

Deleting Folders

To delete a folder, press the ***Del*** button from the specified folder row. The system will confirm folder deletion. Press ***OK*** to delete the folder permanently or ***Cancel*** to go back to the folder list.

WARNING All the data stored in the folder will be deleted once the folder is deleted. The data will not be recoverable.

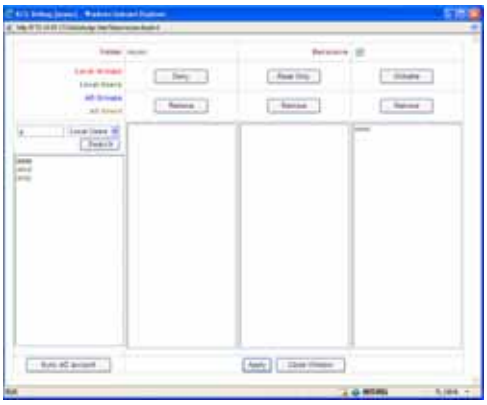
NFS Share

To allow NFS access to the share folder, enable the **NFS Service**, and then set up hosts with access rights by clicking ***Add***.

NFS Share	
Item	**Description**
Hostname	Enter the name or IP address of the host
Privilege	Host has either read only or writeable access to the folder.
Guest System Support	There are two selections available: • Unix / Linux System • AIX (Allow source port > 1024) Choose the one which best fits your needs.
IO Mapping	There are three selections available: • Guest system root account will have full access to this share (root:root). • Guest system root account will be mapped to anonymous user (nobody:nogroup) on NAS. • All user on guest system will be mapped to anonymous user (nobody:nogroup) on NAS. Choose the one which best fits your needs.
Apply	Click to save your changes.
Back	Click to abandon changes.

Folder Access Control List (ACL)

On the Folder screen, press the ***ACL*** button, and the **Access Control List** screen appears. This screen allows you to configure access to the specific folder for users and groups. Select a user or a group from the left hand column and then choose ***Deny***, ***Read Only***, or ***Writable*** to configure their access level. Press the ***Submit*** button to confirm your settings.



Access Control List	
Item	**Description**
Deny	Denies access to users or groups who are displayed in this column.
Read Only	Provides Read Only access to users or groups who are displayed in this column.
Writable	Provides Write access to users or groups who are displayed in this column.
Remove	Removes the selected user or group from the column in order to reset their access privileges.
Sync AD account	Press this button when there is no list from ADS/PDC or more ADS user has been added but yet appear from list.
Submit	Submits and confirms settings.
Reset	Cancel your settings and return to the **Folder** screen.

To configure folder access, follow the steps below:

1. On the **ACL** screen, all network groups and users are listed in the left hand column. Select a group or user from this list.

2. With the group or user selected, press one of the buttons from the three access level columns at the top. The group or user then appears in that column and has that level of access to the folder.

3. Continue selecting groups and users and assigning them access levels using the column buttons.

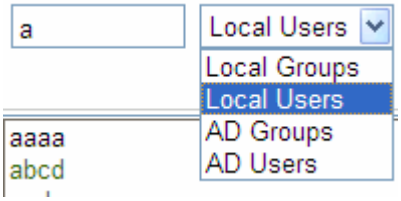
4. To remove a group or user from an access level column, press the ***Remove*** button in that column.

5. When you are finished, press ***Submit*** to submit and confirm your ACL settings.

NOTE If one user has belonged to more than one group but different privilege than the priority Deny > Read Only > Writable

The ACL screen also allows you to search for a particular user. To do this, follow the steps below:

1. In the blank, enter the name of the user you would like to find.



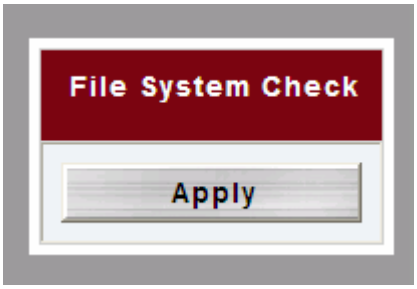
2. From the drop down select the group you would like to search for the user in.

3. Click ***Search***.

NOTE The system will list up to 1,000 users from the chosen category. To narrow your search, enter a search term in the blank provided.

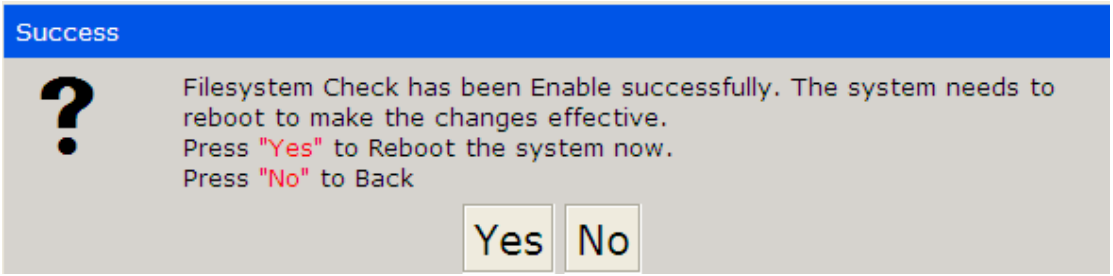
File System Check

The File System Check allows you to perform a check on the integrity of your disks' file system. Under the **Storage** menu, click ***Filesystm Check*** and the **File System Check** prompt appears.



To perform a file system check, click ***Apply***.

Once clicked, the following prompt will appear:


Success
Filesystem Check has been Enable successfully. The system needs to reboot to make the changes effective.
Press "Yes" to Reboot the system now.
Press "No" to Back
Yes
No

Click ***Yes*** to reboot the system.

Once the system has rebooted, you will be returned to the **File System Check** prompt. There you will see the available RAID volumes to run the file system check on. Check the desired RAID volumes and click ***Next*** to proceed with the file system check. Click ***Reboot*** to reboot without running the check.

Once you click ***Next***, you will see the following screen:

Click ***Start*** to begin the file system check. Click ***Back*** to return to the previous screen. Click ***Reboot*** to reboot the system.
When the file system check is run, the system will show 20 lines of information until it is complete. Once complete, the results will be shown at the bottom.

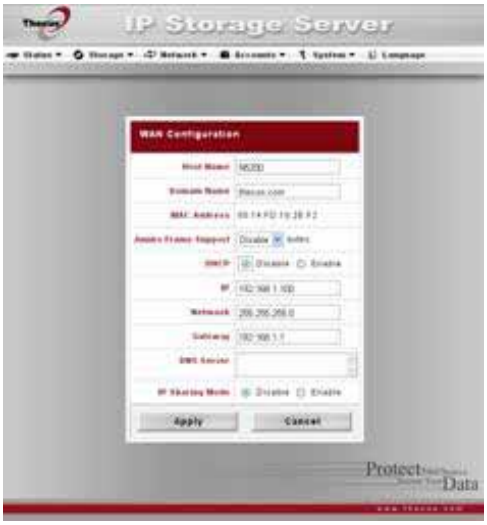
NOTE The system must be rebooted before the 1U4500 can function normally.

Network Management

Use the **Network** menu to make network configuration settings as well as service support settings.

WAN Configuration

From the **Network** menu, choose ***WAN***, and the **WAN Configuration** screen appears. This screen displays the network parameters of the WAN connection. You may change any of these items and press ***Apply*** to confirm your settings. See a description of each item in the following table:



WAN Configuration	
Item	**Description**
Host name	Host name that identifies the 1U4500 on the network.
Domain name	Specifies the domain name of the 1U4500.
MAC Address	MAC address of the network interface.
Jumbo Frame Support	Enable or disable Jumbo Frame Support of the WAN interface on your 1U4500.
DHCP	Enable or disable the 1U4500 from obtaining in IP address via DHCP server. If you require a static IP, disable this feature and input your network configuration.
IP	IP address of the WAN interface.
Netmask	Network mask, which is generally: 255.255.255.0
Gateway	Default Gateway IP address.
DNS Server	Domain Name Service (DNS) server IP address.
IP Sharing Mode	When enabled, PCs connected to the LAN port will be able to access the WAN. Default is Enabled.
Link Aggregation	Specifies whether WAN and LAN ports will be aggregated and act as one port. **Failover**: When one port fails, the other one will take over. **Load Balance**: Ethernet traffic will flow alternative between two Ethernet ports. **802.3ad**: Linkage two Ethernet ports in parallel to increase throughput.

NOTE

- Only use Jumbo Frame settings when operating in a Gigabit environment where all other clients have Jumbo Frame Setting enabled.
- Enabling DHCP automatically turns on UPnP—see the Service Support Screen.
- If you are only using the WAN port, we suggest that you disable IP Sharing Mode. This will result in higher throughput.
- A correct DNS setting is vital to networks services, such as SMTP and NTP.
- To use the Link Aggregation with "802.3ad selected" feature, please make sure the networking equipment on the other end of Ethernet cable also supports 802.3ad protocol.

WARNING

Most Fast Ethernet (10/100) Switches/Routers do not support Jumbo Frame and you will not be able to connect to your 1U4500 after Jumbo Frame is turned on. If this happens, turn off the 1U4500. Then, power on the 1U4500 and immediately press and hold the Reset button on the back of the unit for 10 seconds. This will reset your network settings, password, and turn off Jumbo Frame Support.

LAN Configuration

The 1U4500 supports two Gigabit Ethernet ports for higher service availability. To configure these ports, choose ***LAN*** from the **Network** menu, and the **LAN Configuration** screen appears. Press ***Apply*** to save your changes.

LAN Configuration	
Item	**Description**
MAC Address	Displays the MAC address of the LAN interface.
IP	Specifies the IP address of the LAN interface.
Netmask	Specifies the Network Mask of the LAN interface.
Jumbo Frame Support	Enable or disable Jumbo Frame Support on the LAN interface.

NOTE

Before enabling Jumbo Frame Support, please make sure your network equipment supports Jumbo Frame. If your equipment is incompatible, you might not be able to connect to your 1U4500. In this case, you have to reset the system back to default by the holding down front panel reset button for 5 seconds during boot up *process*.

DHCP Configuration

A DHCP server can be configured to assign IP addresses to devices connected to the LAN port. To configure these ports, choose ***LAN*** from the **Network** menu.

DHCP Configuration	
Item	**Description**
DHCP Server	Enable or disable the DHCP server to automatically assign IP address to PCs connected to the LAN interface.
Start IP	Specifies the starting IP address of the DHCP range.
End IP	Specifies the ending IP address of the DHCP range.
DNS Server	Displayed the DNS server IP address.

NOTE

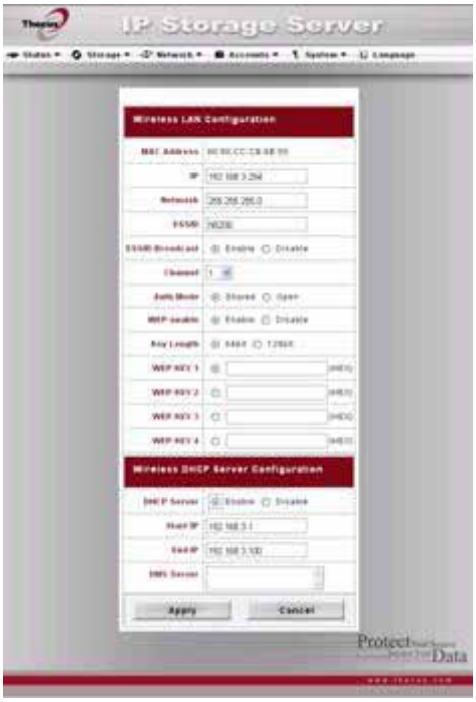
The IP Segment of WAN and LAN should not overlap.

WARNING

The IP address of the LAN interface should not be in the range of the Start IP address and End IP address.

WLAN Configuration

When a compatible wireless USB dongle is installed on the 1U4500, the 1U4500 will become an access point, and the **Network** dropdown menu will contain a **WLAN** menu item. From the **Network** menu, choose ***WLAN***, and the **WLAN Configuration** screen appears. This screen displays the wireless network parameters of the system. You can change any of these items and press ***Apply*** to confirm your settings.



NOTE

- Currently supported USB wireless dongles are: 3Com 3CRUSB10075, Zyxel G220USB, PCI GW-US54mini.
- USB dongles have to be connected before 1U4500 is powered up.

WLAN Configuration	
Item	**Description**
MAC Address	Displays the MAC Address of the USB wireless dongle.
IP	Specifies the IP address of the network connection.
Netmask	Specifies the network mask, which is generally: 255.255.255.0
ESSID	The ESSID (Extended Service Set Identification) is the identifying name of a wireless network.
ESSID Broadcast	Specifies whether the ESSID will be broadcasted by the 1U4500. This will prevent the Access Point from broadcasting the ESSID. The 1U4500 will still respond to a wireless device that wants to communicate if it sends a matching ESSID.
Channel	The channel that the 1U4500 uses to communicate with client devices.
Auth Mode	Authentication mode used by the 1U4500. **Shared:** Shared key authentication **Open:** Open key authentication
WEP Enable	Specifies whether to use encryption for transmission or not.
Key Length	Key length specifies the level of encryption used by the 1U4500. 64 bit: 10 characters from 0 ~ 9 and A ~ F. 128 bit: 26 characters from 0 ~ 9 and A ~ F.
WEP KEY 1	Input up to 4 WEP keys, and select the one you wish to use. When connecting, be sure to enter the same key and select the same index number on each client machine.
WEP KEY 2	
WEP KEY 3	
WEP KEY 4	

A DHCP server can be configured to assign IP addresses to devices connected to LAN ports.

WLAN DHCP Configuration	
Item	**Description**
DHCP Server	Select to enable or disable DHCP server.
Start IP	Specifies the starting IP address of the DHCP range.
End IP	Specifies the ending IP address of the DHCP range.
DNS Server	Specifies the DNS server IP address.

NOTE

The IP Segment of WLAN, WAN and LAN should not overlap.

NOTE

Users should obey the international RF regulatory rules as they set up the wireless RF channel on the 1U4500. The RF operating channels for different regions have been specified as following. Thecus has no responsibility for users attempting to violate the international RF regulation.

11	N. America
14	Japan
13	Europe (ETSI)
2	Spain
4	France

Web Services Configuration

From the **Network** menu, choose the ***Service*** item, and the **Web Service** screen appears. This screen displays the service support parameters of the system. You can change any of these items and press ***Apply*** to confirm your settings. A description of each item follows:

NOTE

- Disable HTTP support and Enable Secure HTTP support to guarantee secure access.
- In some environments, due to security concerns, you may wish to disable SMB/CIFS as a precaution against computer viruses.

Web Service	
Item	**Description**
HTTP (WebDisk) Support	Enable or disable WebDisk support. Enter the port number if this option is enabled. The port number
HTTPs (Secure WebDisk) Support	Enable or disable secure WebDisk support. Enter the port if this option is enabled.
SMB/CIFS	Enable or Disable SMB/CIFS protocol for Windows, Apple, Unix drive mapping.
UPnP	Enable or disable Universal Plug and Play protocol. UPnP helps to find the IP address of the 1U4500.

AFP (Apple Network Setup)

From the **Network** menu, choose the ***AFP*** item, and the **AFP Configuration** screen appears. This screen displays the configuration items for the Apple Filing Protocol. You can change any of these items and press ***Apply*** to confirm your settings. A description of each item follows:

Apple Network Configuration	
Item	**Description**
AFP Server	Enable or disable Apple File Service to use the 1U4500 with MAC OS-based systems.
Zone	Specifies Zone for Applet Talk service. If your AppleTalk network uses extended networks and is assigned with multiple zones, assign a zone name to the 1U4500. If you do not want to assign a network zone, enter an asterisk (*) to use the default setting.

NFS Setup

From the **Network** menu, choose the ***NFS*** item, and the **NFS Server Setting** screen appears. The 1U4500 can act as an NFS server, enabling users to download and upload files with the favorite NFS clients. Press ***Apply*** to confirm your settings. A description of each item follows:

NFS Server Setting	
Item	**Description**
NFS	**Enable** or **Disable** NFS support.
Apply	Click ***Apply*** to save your changes.
Cancel	Click ***Cancel*** to abandon your changes.

User and Group Management

The 1U4500 has built-in user database that allows administrators to manage user access using different group policies. From the **Accounts** menu, you can create, modify, and delete users, and assign them to groups that you designate.

Local User Configuration

From the **Accounts** menu, choose the **Users** item, and the **Local User Configuration** screen appears. This screen allows you to **Add**, **Modify**, and **Delete** local users.

Local User Configuration	
Item	**Description**
Add	Press the ***Add*** button to add a user to the list of local users.
Modify	Press the ***Modify*** button to modify a local user.
Delete	Press the ***Delete*** button to delete a selected user from the system.

Adding Users

1. Click on the ***Add*** button on **Local User Configuration** screen, and **Local User Setting** screen appears.
2. On the **Local User Setting** screen, enter a name in the **User Name** box.
3. Enter a **User ID** number. If left blank, the system will automatically assign one.
4. Enter a password in the **Password** box and re-enter the password in the **Confirm** box.
5. Select which group the user will belong to. **Group Members** is a list of groups this user belongs to. **Group List** is a list of groups this user does not belong to. Use the **<<** or **>>** buttons to have this user join or leave a group.
6. Press the ***Apply*** button and the user is created.

NOTE All users are automatically assigned to the 'users' group.

Modifying Users

1. Select an existing user from the **Local User Configuration** screen.
2. Click on the ***Modify*** button, and **Local User Setting** screen appears.
3. From here, you can enter a new password and re-enter to confirm, or use the **<<** or **>>** buttons to have this user join or leave a group. Click the ***Apply*** button to save your changes.

Deleting Users

1. Select an existing user from the **Local User Configuration** screen.
2. Click on ***Delete*** button and the user is deleted from the system.

Local Groups Configuration

From the **Accounts** menu, choose the ***Groups*** item, and the **Local Groups Configuration** screen appears. This screen allows you to **Add**, **Modify**, and **Delete** local groups.

Local Groups Configuration	
Item	**Description**
Add	Press the ***Add*** button to add a user to the list of local groups.
Modify	Press the ***Modify*** button to delete a selected group from the system.
Delete	Press the ***Delete*** button to delete a selected group from the system.

Adding Groups

1. On the **Local Group Configuration** screen, click on the ***Add*** button.
2. The **Local Group Setting** screen appears.
3. Enter a **Group Name**.
4. Enter a **Group ID** number. If left blank, the system will automatically assign one.

5. Select users to be in this group from the **Users List** by adding them to the **Members List** using the **<<** button.
6. Click the ***Apply*** button to save your changes.

Modifying Groups

1. On the **Local Group Configuration** screen, select a group name from the list.
2. Press the ***Modify*** button to modify the members in a group.
3. To add a user into a group, select the user from the **Users List**, and press the **<<** button to move the user into the **Members List**.
4. To remove a user from a group, select the user from **Members List**, and press the **>>** button.
5. Click the ***Apply*** button to save your changes.

Deleting Groups

1. On the **Local Group Configuration** screen, select a group name from the list.
2. Press ***Delete*** to delete the group from the system.

Batch User and Group Creation

The 1U4500 can also add users and groups in batch mode. This enables you to conveniently add numerous users and groups automatically by importing a simple comma-separated plain text (*.txt) file.

From the **Accounts** menu, click ***Batch Mgmt*** and the **Batch Create Users and Groups dialogue** will appear. To import your list of users and groups, follow these steps:

1. Click ***Browse…*** to locate your comma-separated text file.
   The information in the text file should follow this format:

   ```
   [USERNAME], [PASSWORD], [GROUP]
   ```

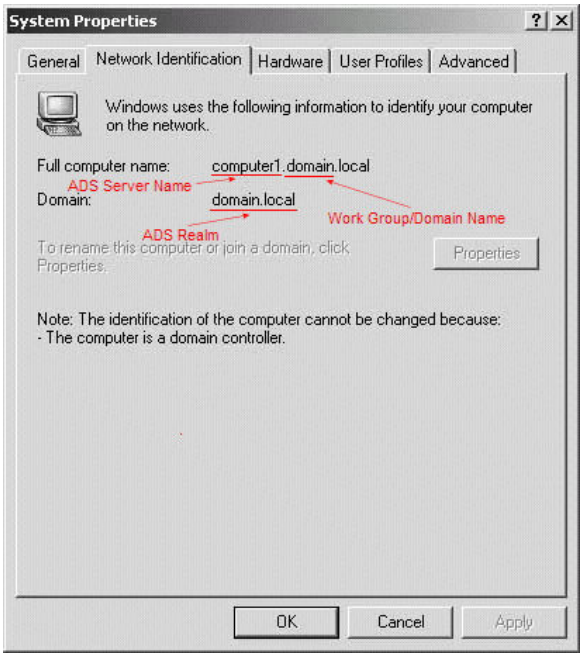
2. Click ***Open***.
3. Click ***Import*** to begin the user list import.

ADS/NT Configuration

If you have a Windows Active Directory Server (ADS) or Windows NT server to handle the domain security in your network, you can simply enable the ADS/NT support feature; the 1U4500 will connect with the ADS/NT server and get all the information of the domain users and groups automatically. From the **Accounts** menu, choose ***Authentication*** item and the **ADS / NT Support** screen appears. You can to change any of these items and press ***Apply*** to confirm your settings. A description of each item follows:

ADS / NT Support	
Item	**Description**
WINS Server	Specifies the WINS server if necessary.
Work Group / Domain Name	Specifies the SMB/CIFS Work Group / ADS Domain Name (e.g. 1U4500).
ADS/NT Support	Select Disable to disable authentication through Windows Active Directory Server or Windows NT.
Authentication Method	Select ADS for Windows Active Directory Server, or select NT for Windows NT
ADS/NT Server Name	Specifies the ADS/NT server name (e.g. adservername).
ADS/NT Realm	Specifies the ADS/NT realm (e.g. example.com).
Administrator ID	Enter the administrators ID of Windows Active Directory or Windows NT, which is required for 1U4500 to join domain.
Administrator Password	Enter the ADS/NT Administrator password.
Confirm Password	For re-entering password to confirm.

To join an AD domain, you can refer the figure and use the example below to configure the 1U4500 for associated filed input:



AD Domain Example	
Item	**Information**
Work Group / Domain Name	domain
ADS Support	Enable
ADS Server Name	Computer1
ADS/NT Realm	Domain.local
Administrator ID	Administrator
Administrator Password	**********
Confirm Password	**********

NOTE

- The DNS server specified in the WAN configuration page should be able to correctly resolve the ADS server name.
- The time zone setting between 1U4500 and ADS should be identical.
- The system time difference between 1U4500 and ADS should be less than five minutes.
- The Administrator Password field is for the password of ADS (Active Directory Server) not 1U4500.

System Settings

The **System** menu gives you a wealth of settings that you can use to configure your 1U4500's system administration functions. You can set up system notifications, view system logs, and even upgrade firmware from this menu.

System Notifications

From the **System** menu, choose the ***Notification*** item, and the **Notification Configuration** screen appears. This screen lets you have the 1U4500 notify you in case of any system malfunction. Press ***Apply*** to confirm all settings. See following table for a detailed description of each item.

NOTE Consult with your mail server administrator for email server information.

Notification Configuration	
Item	**Description**
Beep Notification	Enable or disable the system beeper that beeps when a problem occurs.
Email Notification	Enable or disable email notifications of system problems.
SMTP Server	Specifies the hostname/IP address of the SMTP server.
Port	Specifies the port to send outgoing notification emails.
Auth Type	Select the SMTP Server account authentication type.
SMTP Account ID	Set the SMTP Server Email account ID.
Account Password	Enter a new password.
Confirm Account Password	Confirm a new password.
Receiver's E-mail Address	Add one or more recipient's email addresses to receive email notifications.
Test E-Mail	Click to send out a test e-mail to make sure the settings are correct.

System Logs

From the **System** menu, choose the **Logs** item and the **System Logs** screen appears. This screen shows a history of system usage and important events such as disk status, network information, and system booting. See the following table for a detailed description of each item:

System Logs	
Item	**Description**
Truncate All Log File	Clear all log files.
|<< < > >>|	Use the forward (**> >>|**) and backward (**|<< <**) buttons to browse the log pages.
INFO	Provides all log information including warning messages and error messages.
WARN	Shows all warning messages and error messages.
ERROR	Shows only error messages.
GO	Specify the number of lines per page and press Go.
Ascending	Shows logs by date in ascending order.
Descending	Shows logs by date in descending order.
Download All Log File	Export all logs to an external file.

Time and Date Settings

From the **System** menu, choose the **Time** item and the **Time** screen appears. Set the desired **Date**, **Time**, and **Time Zone**. You can also elect to synchronize the system time on the 1U4500 with an **NTP (Network Time Protocol) Server**. You can change any of these items and press ***Apply*** to confirm your settings.

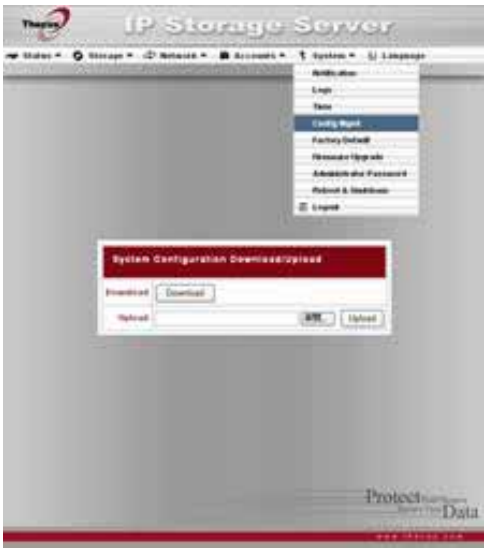
See the following table for a detailed description of each item:

Time	
Item	**Description**
Date	Sets the system date.
Time	Sets the system time.
Time Zone	Sets the system time zone.
NTP Server	Select ***Yes*** to allow the 1U4500 to synchronize with the NTP server shown below. Select ***Manually*** to allow the 1U4500 to synchronize with an NTP server of your choice. Select ***No*** to not have the 1U4500 to synchronize with an NTP server.

WARNING If an NTP server is selected, please make sure your 1U4500's network has been setup to access the NTP server.

System Configuration Backup and Restore

From the **System** menu, choose the ***Config Mgmt*** item and the **System Configuration Download / Upload** screen appears. From here, you can download or upload stored system configurations. See the following table for a detailed description of each item.



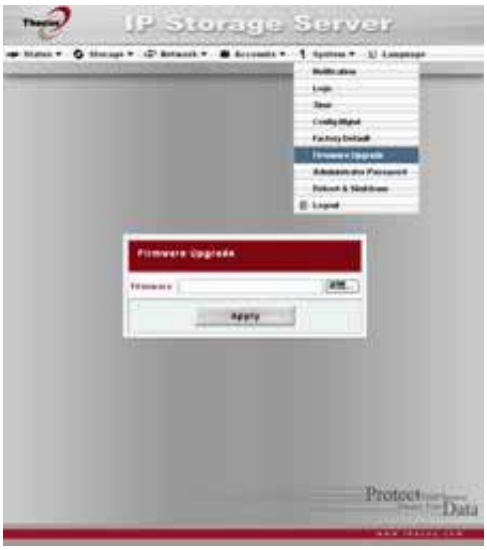
System Configuration Download / Upload	
Item	**Description**
Download	Save and export the current system configuration.
Upload	Import a saved configuration file to overwrite current system configuration.

NOTE

Backing up your system configuration is a great way to ensure that you can revert to a working configuration when you are experimenting with new system settings.
The system configuration you have backup can be only restore in same firmware version. And the backup details have excluded user/group accounts.

Reset to Factory Default Settings

From the **System** menu, choose the ***Factory Default*** item and the **Reset to Factory Default** screen appears. Press ***Apply*** to reset the 1U4500 to factory default settings. Press ***Cancel*** to go back to the main menu.



WARNING

Resetting to factory defaults will not erase the data stored in the hard disks, but WILL revert all the settings to the factory default values.

Upgrading System Firmware

From the **System** menu, choose the ***Firmware Upgrade*** item and the **Firmware Upgrade** screen appears.

Follow the steps below to upgrade your firmware:

1. Use the ***Browse*** button to find the firmware file.
2. Press ***Apply***.
3. The beeper beeps and the Busy LED blinks until the upgrade is complete.

NOTE

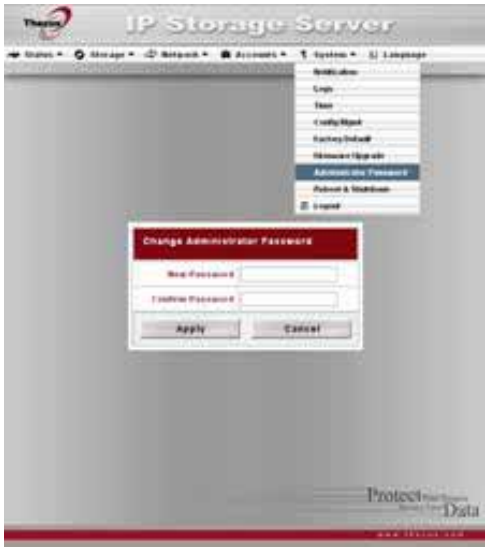
- The beeper only beeps if it is enabled in the System Notification menu.
- Check Thecus website for the latest firmware release and release notes.

WARNING

Do NOT turn off the system during the firmware upgrade process. This will lead to a catastrophic result that may render the system inoperable.

Change Administrator Password

From the **System** menu, choose the ***Administrator Password*** item and the **Change Administrator Password** screen appears. Enter a new password in the **New Password** box and confirm your new password in the **Confirm Password** box. Press ***Apply*** to confirm password changes. See the following table for a detailed description of each item.



Change Administrator Password	
Item	**Description**
New Password	Type in a new administrator password.
Confirm Password	Type the new password again to confirm.
Apply	Press this to save your changes.

Reboot and Shutdown System

From the **System** menu, choose **Reboot & Shutdown** item, and the **Shutdown/Reboot System** screen appears. Press ***Reboot*** to restart the system or ***Shutdown*** to turn the system off.

Logout

To logout of the Web Administration Interface, navigate to ***System*** > ***Logout***.

Chapter 5: Additional Feature Setup

Overview

The 1U4500 can also act as an FTP Server, allowing employees and clients to transfer files using their favorite FTP programs. The integrated Print Server allows you to share a single USB printer will all users on the network. The following section shows you how.

FTP Server

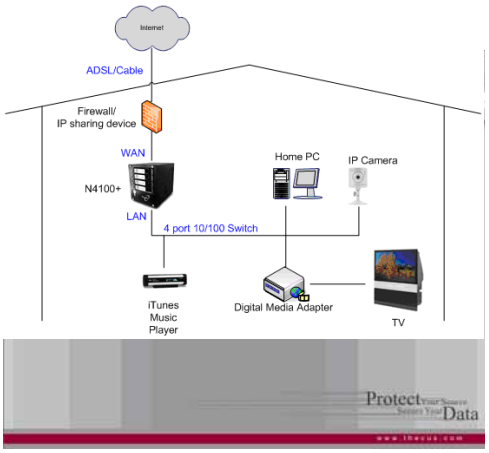
1U4500 can act as a FTP server, enabling users to download and upload files with their favorite FTP programs. From the **Network** menu, choose the ***FTP*** item, and the **FTP** screen appears. You can change any of these items and press ***Apply*** to confirm your settings. A description of each item follows:

FTP	
Item	**Description**
FTP	Enable FTP Service on the 1U4500.
FTP ENCODE	If your FTP client or operating system does not support Unicode (e.g. Windows® 95/98/ME or MAC OS9/8), select the same encoding as your OS here in order to properly view the files and directories on the server. Available options are BIG5, HZ, GB2312, GB18030, ISO, EUC-JP, SHIFT-JIS and UTF-8.

To access the share folder on the 1U4500, use the appropriate user login and password set up on the **Users** page (***Accounts*** > ***Users***). Access control to each share folder is set up on the **ACL** page (***Storage*** > ***Folder*** > ***ACL***).

Printer Server

You can configure the 1U4500 to act as a printer server. That way, all PCs connected to the network can utilize the same printer.



Windows XP SP2

To set up the Printer Server in Windows XP SP2, follow the steps below:

1. Connect the USB printer to one of the USB ports (preferably the rear USB ports; front USB ports can be used for external HDD enclosures).
2. Go to ***Start*** > ***Printers and Faxes***.
3. Click on **File** > **Add Printer**.
4. The **Add Printer Wizard** appears on your screen. Click ***Next***.
5. Select the "***A network printer, or a printer attached to another computer***" option.
6. Select "***Connect to a printer on the Internet or on a home or office network***", and enter "**`http://1U4500_IP_ADDRESS:631/printers/usb-printer`**" into the URL field.
7. Your Windows system will ask you to install drivers for your printer. Select correct driver for your printer.
8. Your Windows system will ask you if you want to set this printer as "Default Printer". Select ***Yes*** and all your print jobs will be submitted to this printer by default. Click ***Next***.
9. Click ***Finish***.

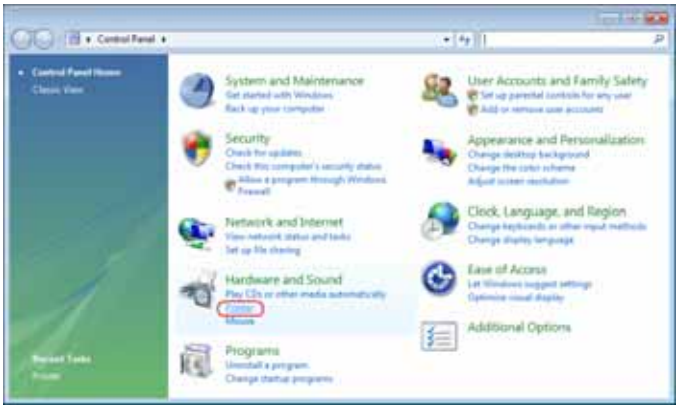
NOTE

- Not all USB printers are supported. Please check Thecus website for a list of supported printers.
- Note that if a multi-function (all-in-one) printer is attached to the 1U4500, usually only the printing and fax functions will work. Other features, such as scanning, will probably not function.

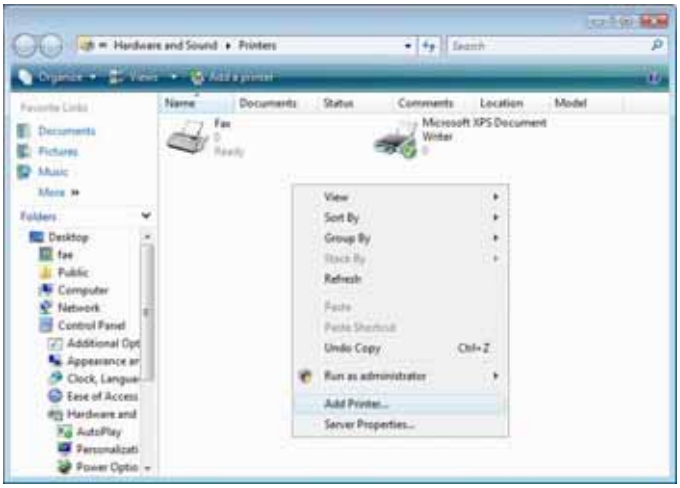
Windows Vista

To set up the Printer Server in Windows Vista, follow the steps below:

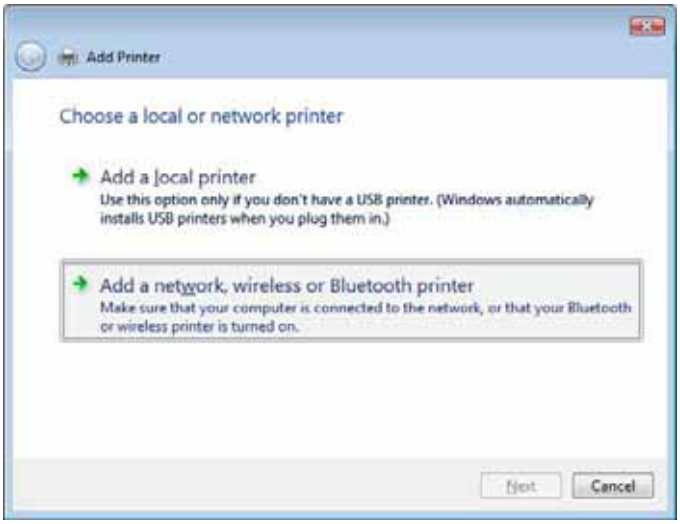
1. Open ***Printer Folder*** from the **Control Panel**.



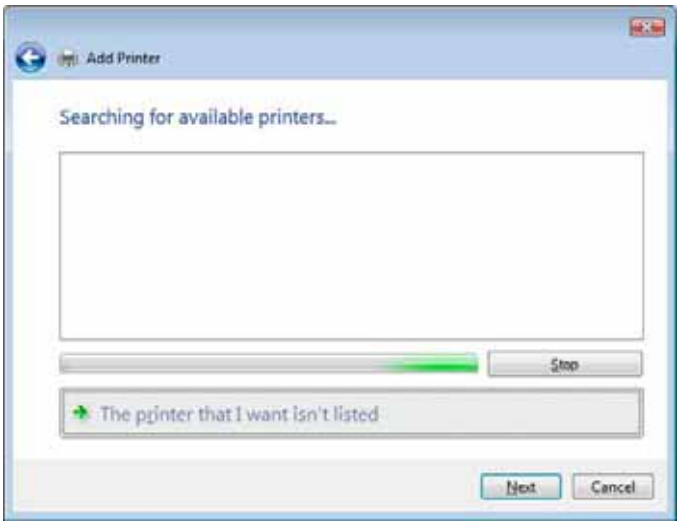
2. Click the right mouse button in anywhere on the **Printers** folder and then select ***Add Printer***.



3. Select ***Add a network, wireless or Bluetooth printer***.

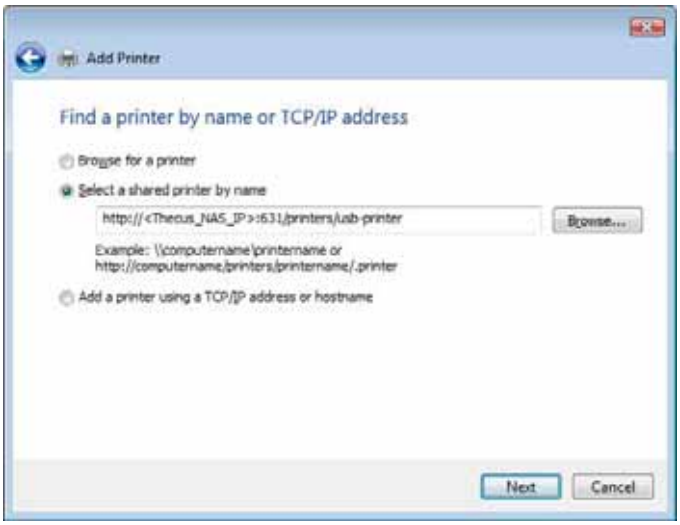

Add Printer
Choose a local or network printer
Add a local printer
Use this option only if you don't have a USB printer. (Windows automatically installs USB printers when you plug them in.)
Add a network, wireless or Bluetooth printer
Make sure that your computer is connected to the network, or that your Bluetooth or wireless printer is turned on.
Next
Cancel

4. Select ***The printer that I want isn't listed***.



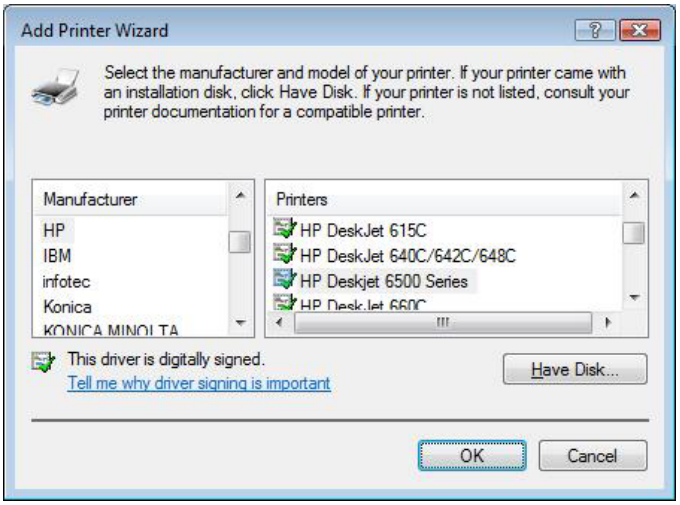
You can press ***The printer that I want isn't listed*** to go into next page without waiting for **Searching for available printers** to finish.

5. Click ***Select a shared printer by name***.



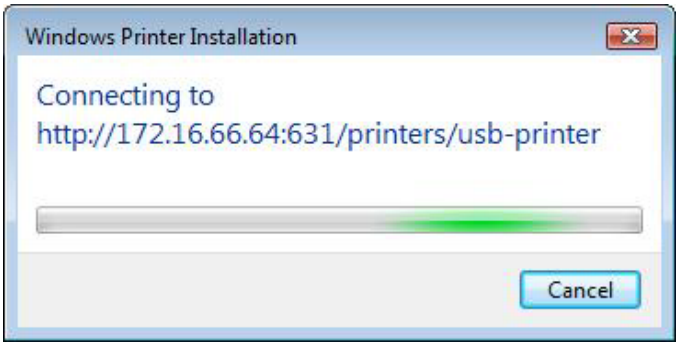
Type `http://<Thecus_NAS>:631/printers/usb-printer` in the box, where <Thecus_NAS_IP> is the IP address of the 1U4500. Click ***Next***.

6. Select or install a printer and then press ***OK***.

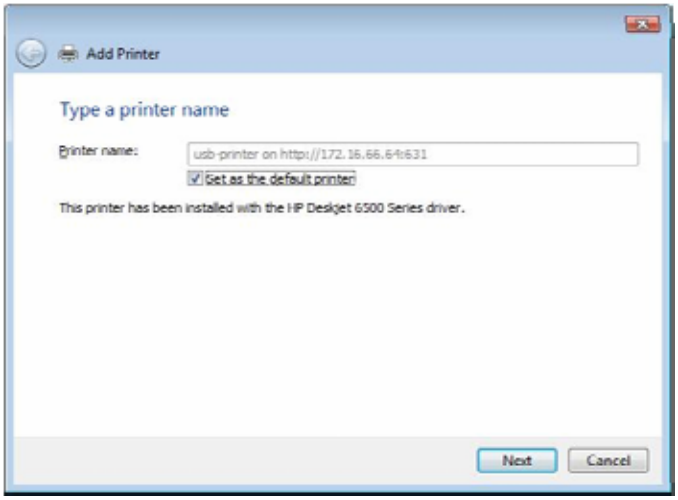

Add Printer Wizard
Select the manufacturer and model of your printer. If your printer came with an installation disk, click Have Disk. If your printer is not listed, consult your printer documentation for a compatible printer.
Manufacturer
HP
IBM
infotec
Konica
KONICA MINOLTA
Printers
HP DeskJet 615C
HP DeskJet 640C/642C/648C
HP Deskjet 6500 Series
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
OK
Cancel

If your printer model is not listed, please contact your printer manufacturer for help.

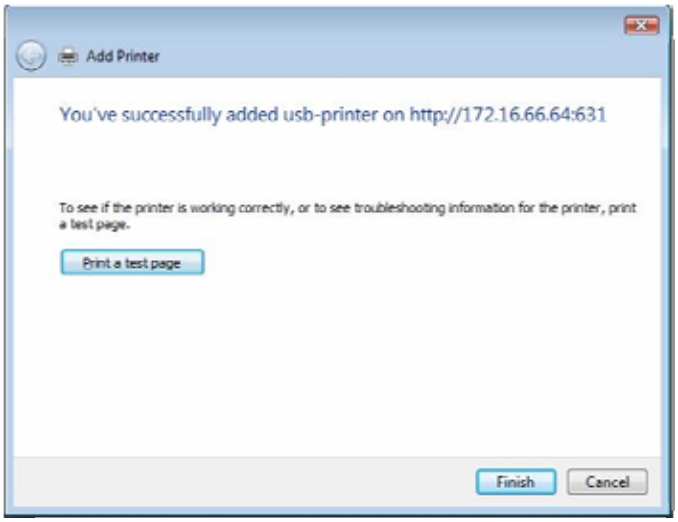
7. Windows will attempt to connect to the printer.



8. You can choose to set this printer as the default printer by checking the ***Set as the default printer*** box. Click ***Next*** to continue.



9. Done! Click ***Finish***.


Add Printer
You've successfully added usb-printer on http://172.16.66.64:631
To see if the printer is working correctly, or to see troubleshooting information for the printer, print a test page.
Print a test page
Finish
Cancel

Chapter 6: Using the 1U4500

Overview

Once the 1U4500 is setup and operating, users on the network may manage all varieties of digital music, photos, or files by simply using their web browsers. To manage your personal files or access public files on the 1U4500, just enter its IP address into your browser (default IP address is `http://192.168.1.100`), and you will be taken to the **1U4500 Login** page.

NOTE

Before proceeding, make sure that WebDisk Support or Secure WebDisk Support is enabled in the Service Support screen in the system's **Network** menu. See Service Support in Chapter 4: System Management > Network Management > Web Services Configuration.

Login Page

To login to the system, enter your user name and password, and click ***Login*** to log into the system. You will be taken to the **WebDisk** interface.

Using WebDisk

The 1U4500 provides a WebDisk function that allows you to access the system over the Internet from any browser.

1. In the Login page, type in the User ID and password that were previously set for you in the Accounts menu. See **Chapter 4: System Management > User and Group Management > Local User Configuration**.

2. The WebDisk page appears showing folders made currently available to you via the **Access Control List (ACL)**.

3. Click on a folder name to enter the folder.

4. The folder's page appears displaying files and folders. Click on a file to download the file.

Folder Page	
Item	**Description**
Name	Displays the names of folders and files.
Size	Shows the size of folders and files.
Type	Displays the type of folders and files.
Modified Date	Shows the time of most recent modification of folders and files.

5. Buttons on the folder page allow you to create a new folder, upload files and delete files in the folder.

Folder Page Buttons	
Button	**Description**
Up	Goes to the previous folder level.
New folder	Creates a new folder.
New file (upload)	Uploads a file from your computer to the current folder.
Delete Selected Items	Deletes selected files and folders.

6. To create a new folder within the current folder, press the New folder button. When the screen appears enter a name for the folder. Press OK to create the folder.

7. To upload a file from your computer to the current folder, press the New file (upload) button. When the screen appears, press Browse and locate the file to upload. Press **OK** and the file is uploaded to the current folder.

8. To delete a file or folder, select the file or folder's check box. Press the Delete selected items button. You can also check the check box as the red circle indicates to select all files and folders in this folder.

To access folders with access control, you must first login with a local user account.

For more information on how to setup user rights to the folders, please check ***Chapter 4: System Management > Folder Management > Folder Access Control List (ACL).***

Mapping a Client PC to the 1U4500

You can map share folders on the 1U4500 so that you can access them as if they were drives on your computer. You can connect to the shared network folders on the 1U4500 as follows:

Windows

1. Go to the **My Computer** folder in Windows.

2. In the menu bar, select ***Tools*** and then ***Map Network Drive…***

3. The **Map Network Drive** window appears.

4. Assign a drive letter for the share folder.

5. Click the ***Browse*** button to find the folder over your network. Alternatively, you may enter the folder name you wish to connect to or enter its IP address. (i.e. `\\192.168.1.100\share`)

6. Click ***Finish***. When the **Connect As…** window appears, enter your user name and password.

7. Click ***OK***. The share folder appears as the drive you assigned. You can now access this folder as though it were a drive on your computer.

Apple OS X

On an Apple computer, you can connect to shared computers and servers using a network address.

1. Choose ***Go*** > ***Connect to Server…***

2. Enter the network address for the server in the Server Address text box.
   When connecting using SMB/CIFS protocol, type:
   `smb://192.168.1.100/Folder1`
   When connecting using AFP protocol, type:
   `afp://192.168.1.100/Folder1`
   Click ***Connect***.

3. When MAC OS X is trying to connect 1U4500, it will ask for a User Name and Password which has access to the folder.

4. When MAC OS X has connected to the 1U4500 successfully, an icon representing the folder will appear on the MAC OS X desktop. You can access the folder by double clicking on the icon.

Mapping the 1U4500 as an iSCSI Drive

With the 1U4500, you are able to map it as an iSCSI drive. With iSCSI, you can remotely access the 1U4500 at great speeds, as if it were installed as a local drive in your computer.

To do this, simply follow the steps below:

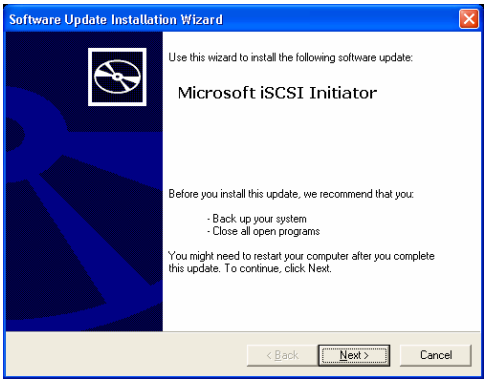
Windows 2000/XP

1. First, download the iSCSI Initiator from the Microsoft website (http://www.microsoft.com). You can find this software by entering `iSCSI Initiator` into the search box on their homepage.

2. Once the download is complete, install the iSCSI Initiator by double-clicking the EXE file. You may be presented with the following security warning. Click ***Run*** to continue.

Open File - Security Warning
Do you want to run this file?
Name: Initiator-2.04-build3273-x86fre.exe
Publisher: Microsoft Corporation
Type: Application
From: U:\John\iSCSI
Run
Cancel
While files from the Internet can be useful, this file type can potentially harm your computer. Only run software from publishers you trust. What's the risk?

3. You will now install the iSCSI Initiator using the Setup Wizard. Click ***Next*** to continue.

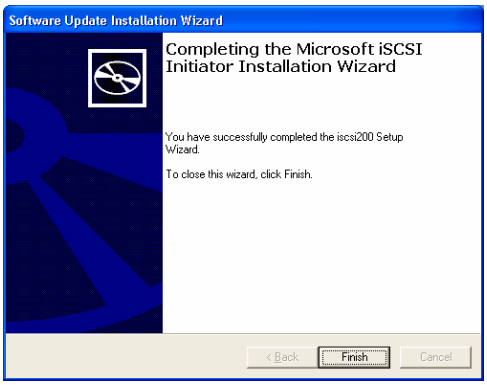

Software Update Installation Wizard
Use this wizard to install the following software update:
Microsoft iSCSI Initiator
Before you install this update, we recommend that you:
- Back up your system
- Close all open programs
You might need to restart your computer after you complete this update. To continue, click Next.
< Back
Next >
Cancel

4. Leave the default selections and click ***Next***.

5. Read the license agreement. To continue with the installation, click ***I Agree*** and then click ***Next***.

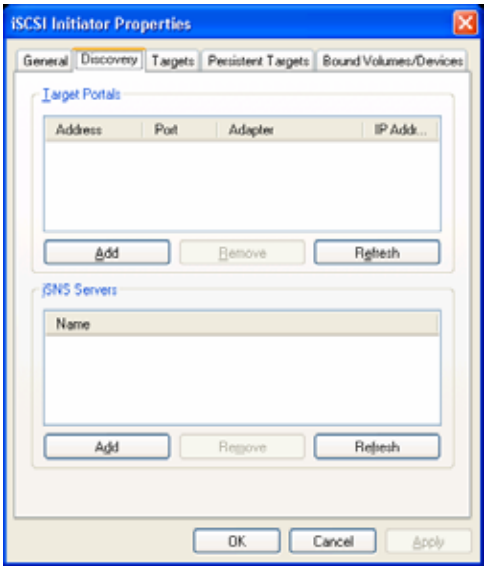
Software Update Installation Wizard
License Agreement
Please read the following license agreement. To continue with setup, you must accept the agreement.
END-USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE
Microsoft iSCSI Initiator 2.0
IMPORTANT - PLEASE READ THIS END-USER LICENSE AGREEMENT ("EULA") CAREFULLY. BY INSTALLING, COPYING OR OTHERWISE USING THE SOFTWARE THAT
I Do Not Agree
I Agree
Print
< Back
Next >
Cancel

6. The iSCSI Initiator will now install automatically. Click ***Finish*** once completed.

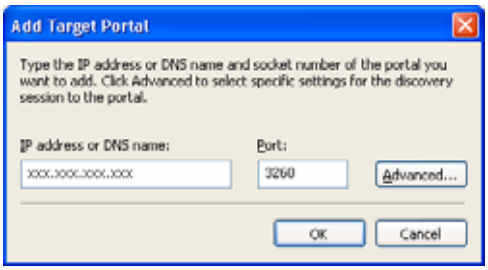

Software Update Installation Wizard
Completing the Microsoft iSCSI Initiator Installation Wizard
You have successfully completed the iscsi200 Setup Wizard.
To close this wizard, click Finish.
< Back
Finish
Cancel

7. Start the iSCSI Initiator by double-clicking its icon on the desktop. The iSCSI Initiator properties window will appear.

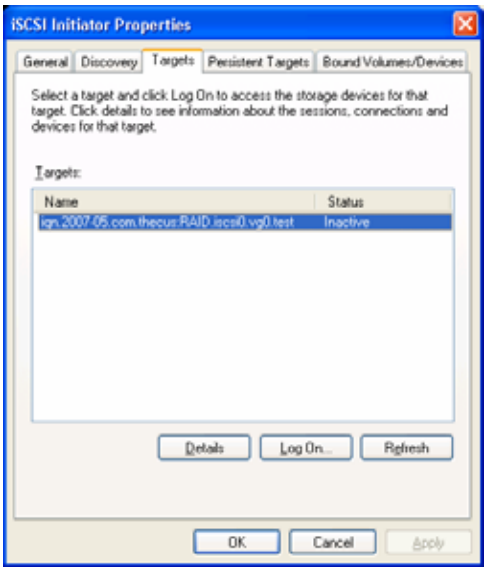
8. Select the ***Discovery*** tab. Under **Target Portals**, click ***Add***.



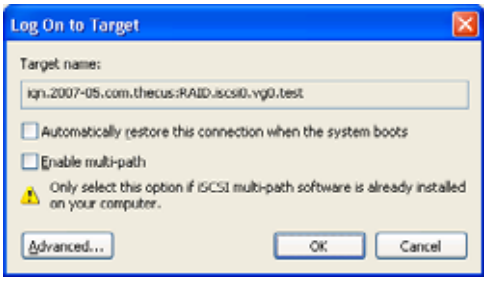
9. Enter the IP address of the 1U4500. Click ***OK***.


Add Target Portal
Type the IP address or DNS name and socket number of the portal you want to add. Click Advanced to select specific settings for the discovery session to the portal.
IP address or DNS name:
Port:
xxx.xxx.xxx.xxx
3260
Advanced...
OK
Cancel

10. On the **iSCSI Initiator Properties** window, select the ***Targets*** tab. With the iSCSI target highlighted, click ***Log On***. The **Log On to Target** dialogue will appear.



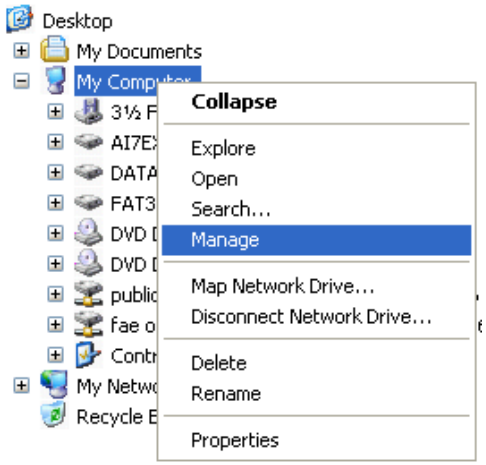
11. If you have not enabled CHAP, click ***OK*** to continue.



If you have enabled CHAP, click ***Advanced***. Under Advanced Settings, check the **CHAP login information** checkbox and enter your username and password. Click ***OK***.

Advanced Settings
General
IPSec
Connect by using
Local adapter:
Default
Source IP:
Default
Target Portal:
Default
CRC / Checksum
Data digest
Header digest
CHAP logon information
CHAP helps ensure data security by providing authentication between a target and an initiator trying to establish a connection. To use it specify the same target CHAP secret that was configured on the target for this initiator.
User name:
iqn.1991-05.com.microsoft:thecus-2c1fb4b4.thecus.
Target secret:
Perform mutual authentication
To use mutual CHAP specify an initiator secret on the Initiator Settings page and configure that secret on the target.
OK
Cancel
Apply

12. Right click ***My Computer*** on the desktop and select ***Manage***.



13. Click on Disk Management and you will see a new hard disk listed.

14. Initialize the new hard disk and you will then be able to use the iSCSI target as a local drive.

Windows Vista

Because Windows Vista has the Microsoft iSCSI Initiator pre-installed, you will not have to install this piece of software. Instead, start the iSCSI Initiator and follow steps 8-14 to map the 1U4500 as an iSCSI drive.

File Backup

There are a number of ways to back up data with the 1U4500.

Nsync

You can backup a share folder to another 1U4500 (Nsync Target) or any FTP server for safe keeping as long as you have appropriate access right on that target. When using Nsync between two 1U4500s, you have the option to transmit files securely between two 1U4500s.

If the files on your 1U4500 are lost for any reason, you can restore those files from the target 1U4500. To backup files regularly, you can set up a scheduled task to run only once, daily, weekly, or monthly. You can also limit the bandwidth of your Nsync tasks, so other users on the network can share the bandwidth equally.

Under the **Storage** menu, click ***Nsync*** and the **Nsync** window appears. Below is a description of each field:

Nsync	
Item	**Description**
Task name	The name of your Nsync task.
Server	The IP address of your target server
Share folder	The share folder you would want to backup.
Last Time	The time when the last Nsync task was executed.
Last Status	The status of your last Nsync task.
Action	Administrator can run or stop an Nsync task by pressing the action button.
Bandwidth Setting	Bandwidth control on Nsync tasks.
Add	Click to add a Nsync task
Modify	Click to modify an Nsync task.
Restore	Restore share folder from an Nsync target.
Delete	Click to delete an Nsync task. Backup files on Nsync target is

	also deleted.

Adding an Nsync Task

From the **Nsync Information** screen, click ***Add*** to display the **Add Nsync Task** screen.

Add Nsync Task	
Item	**Description**
Task Name	The name of your Nsync task.
Manufacturer	Select whether the target is a Thecus Product (e.g. 1U4500) or FTP server.
Target Server IP Address	The IP address of your target server.
Source Folder	The share folder you want to backup.
Nsync Task Name	The name of your Nsync task.
Authorized Username on Target Server	The account name on the target server.
Password on Target Server	The password for the username on the target server.
Test Connection	Click to check the connection to the Target Server.
Schedule	Schedule backup of your share folders.
Time	The time when the Nsync task will run.
Type	Select whether to run the Nsync task daily, weekly, or monthly. **Daily**: input the time of day to execute Nsync task. **Weekly**: input which day of the week to execute the task. **Monthly**: decide which day of the month to execute the task.
Apply	Click to submit the task.

NOTE Before starting an Nsync Task, make sure the target server's Nsync Server (or FTP Server) is enabled.

Setting Up an Nsync Target on an Nsync Device

On the Nsync target server, the administrator of that server has to set up a user account with a folder named "nsync" and grant write access.

1. On the Nsync server, add a user for Nsync source (ex. nsyncsource1). For instructions on how to add a user on the 1U4500, see **Chapter 4: System Management > User and Groups Management > Local User Configuration > Adding Users**.

2. On the Nsync server, grant that user (ex. nsyncsource1) write access to the **nsync** folder. For instructions on how to set up a folder's ACL, see **Chapter 4: System Management > Folder Management > Folder Access Control List (ACL)**.

3. Once this is done, the target server will start accepting Nsync tasks from server using that ID and password.

Setting Up an Nsync Target on Another Device

If you selected "Other Device" when setting up your Nsync task, the 1U4500 will use the FTP protocol to back up the share folder. On the external storage device, make sure there is a folder named "nsync", and the Auth ID has writable permission in that folder.

Designating 1U4500 as an Nsync Target

The 1U4500 can act as an Nsync server, enabling another Nsync-equipped Thecus NAS at a remote location backup their files to this 1U4500. From the **Network** menu, choose the ***Nsync Target*** item, and the **Nsync Target Server Setting** screen appears.

Nsync Target Server Setting	
Item	**Description**
Nsync Target Server	Enable or Disable Nsync Target support.

NOTE To enable Nsync task to go thru firewall, you have to open port TCP/1194 on your firewall in both directions.

Thecus Backup Utility

The Thecus Backup Utility is on your Installation CD. When you click on the CD, the Backup Utility will be installed under **Program Groups** > **Thecus** > **Thecus Backup Utility**. If it is not installed, you can copy the file (**Thecus Backup Utility.exe**) to a convenient location on your hard disk and double click to execute it.

NOTE If you can not find Thecus Backup Utility on your CD, please download it from the Thecus website (http://www.thecus.com).

When you execute this utility for the first time, it will ask you whether to create a DB file. Click ***Yes***.

1. Click ***Add*** to create a Backup task. The **Add New Task** dialog box appears.

Add New Task	
Item	**Description**
Task	Specifies a name for the current task.
Source	Click to specify the source folder/file location.
Incremental	Click to specify whether the backup will be incremental. If unchecked, the backup will be a full backup.
Destination	Click to specify the destination folder/file location.
Excluded extensions	Files with these file name extensions will be skipped and not back up to the destination.
Comments	If you wish, enter comments here for your records.

2. To schedule the task to run at regular intervals, click on the ***Schedule*** icon for that task. You can schedule the task to run **Monthly** or **Weekly**.

3. To check the log for that task, click on the ***Log*** icon for that task.

NOTE Thecus Backup Utility also supports MAC OS X. Just copy the Thecus Backup Utility.dmg to your MAC OS X machine and double click to execute it.

Windows XP Data Backup

If you use Windows XP Professional, you can also use the Windows Backup Utility (Ntbackup.exe) to backup your files.

If you use Windows XP Home Edition, follow these steps to install the utility:

1. Insert the Windows XP CD into a drive and double-click the ***CD*** icon in **My Computer**.

2. When the Welcome to Microsoft Windows XP screen appears, click ***Perform Additional Tasks***.

3. Click ***Browse this CD***.

4. In Windows Explorer, navigate to ***ValueAdd*** > ***Msft*** > ***Ntbackup***.

5. Double-click ***Ntbackup.msi*** to install the backup utility.

Once installed, you can use the Windows Backup Utility by following the steps below:

1. Click ***Start***, and point to ***All Programs*** > ***Accessories*** > ***System Tools*** > ***Backup*** to start the wizard.

2. Click ***Next*** to skip past the opening page. Choose **Backup files and settings** from the second page, and then click ***Next***.

3. Select which option you want to back up.

4. Click ***Next*** and in the Backup Type, Destination, and Name page, specify a back up location using the ***Browse*** button.

5. Find and select the drive that specifies your 1U4500 as your backup destination and click ***Next***.

6. Click ***Next*** to display the wizard's final page and click ***Finish*** to start backing up.

Apple OS X Backup Utilities

Mac OS X does not include any backup software. However, there are a number of backup solutions available for the Mac OS X, including: iBackup, Psyncx, iMSafe, Rsyncx, Folder Synchronizer X, Tri-BACKUP, Impression, Intego Personal Backup, SilverKeeper, and Apple's dotMac Backup utility to name just a few. To find even more freeware and shareware backup utilities to choose from, go to VersionTracker or MacUpdate and search on "backup".

Chapter 7: Tips and Tricks

USB and eSATA Storage Expansion

The 1U4500 supports external USB hard disks through its three USB ports. Once a USB hard disk has successfully mounted, the entire volume will be copied automatically to the default USB HDD folder. The 1U4500 supports up to 6 USB external storage devices. All file names on the USB disk volume are case sensitive.

The 1U4500 also supports eSATA hard disks with its eSATA port.

Before attaching an eSATA or USB disk drive to 1U4500, you have to partition and format it on a desktop computer or a notebook first. The attached device will be located at `\\192.168.1.100\usbhdd\sdf1` where `192.168.1.100` means the IP address of 1U4500 and `sdf1` stands for the first partition on disk #6, the eSATA or USB disk drive. If it is an NTFS partition, NAS users can open or copy files from `\\192.168.1.100\usbhdd\sdf1` but cannot add new files or modify existing files.

NOTE

If you want to write to an USB storage device, the file system must be FAT32.

USB Storage	FAT32 Partition	NTFS Partition
Read	OK	OK
Write	OK	-

Adding a Spare Disk

With a RAID 1, RAID 5, RAID 6, or RAID 10 volume, you can add a spare disk after the initial RAID is setup. To add a spare disk, follow the steps below:

1. On the **RAID Configuration Screen**, tick the checkbox of the hard disk you wish to designate as a spare disk.

2. Click ***Add Spare***. The disk will be configured as a spare disk. The system automatically rebuilds the spare disk when one of the disks in the RAID set fails.

Target USB

1U4500 can operate in dual mode. When connecting to a regular USB disk or thumb drive, 1U4500 is acting as USB host. When connecting to a PC thru its USB Type B connector on the back panel, 1U4500 can act as a USB disk. This feature allows user to transfer files without using network connection.

When you create RAID, you can assign a portion of space on the RAID to be used as USB disk. When connecting 1U4500 to a PC using the supplied USB A to B cable, the PC will recognize this space as an unformatted disk. At this point, the PC can format this portion of disk and create file system on it. Since this disk is created on the RAID, it will be protected by the RAID level you select.

WARNING

When RAID is removed or damaged, all the data on the Target USB device will be deleted.

Remote Administration

You can set up your 1U4500 for remote administration. With remote administration, you can access your 1U4500 over the Internet, even if your 1U4500 is behind a router. This is especially useful if you are traveling and suddenly need a file from your 1U4500.

Setting up remote administration is a three-part process, and will require the following equipment:

- Thecus 1U4500 NAS device
- Cable/DSL Router with Dynamic DNS support
- Home PC
- Internet Connection

NOTE Router setup will differ slightly depending on router used. For this example, we will use the Asus WL500g because it has support for Dynamic DNS. Contact your router hardware vendor for setup help.

Part I - Setup a DynDNS Account

1. Go to `http://www.dyndns.org` from your home PC.
2. Click on the ***Sign Up Now*** link.
3. Check the Check boxes, select a user name (i.e.: 1U4500), enter your email address (i.e.: xxx@example.com), check ***Enable Wildcard***, and create a password (i.e.: xxxx).
4. Wait for an email from www.dyndns.org.
5. Open the email and click on the link to activate your account

Part II - Enable DDNS on the Router

1. Go to the router setup screen and select ***IP Config*** > ***Miscellaneous DDNS Setting*** from your Home PC.
2. Click on ***Yes*** for **Enable the DDNS Client?**
3. Select **`www.dyndns.org`**.
4. Go to router setup screen, and enter the following information:
    a. User Name or E-mail Address: **xxx@example.com**
    b. Password or DDNS Key: **xxxx**
    c. Host Name: **`www.1U4500.dyndns.org`**
    d. Enable wildcard? Select ***Yes***
    e. Update Manually: Click ***Update***

Part III - Setting up Virtual Servers (HTTPS)

1. Navigate to ***NAT Setting*** > ***Virtual Server***.
2. For **Enable Virtual Server?**, select ***Yes***
3. Setup the HTTPS Server
    a. **Well-Known Applications**: Select **User Defined**
    b. **Local IP**: Enter **`192.168.1.100`**
    c. **Port Range**: **443** (the default HTTPS port setting on the 1U4500)
    d. **Protocol**: select **TCP**
    e. Click ***Add***.
    f. Click ***Apply***.
4. Test the HTTPS connection from another computer on the Internet
    a. From a remote computer, open your browser and enter **`https://www.1U4500.dyndns.org`**

b. You should see the login page of 1U4500.

Firewall Software Configuration

If you are using a software firewall (i.e. Norton Internet Security) and are having trouble connecting to the 1U4500, you can try the following steps:

1. Double click the **NIS** icon on system tray, and then configure the **Personal Firewall**.

2. On the **Programs** page, find the **SetupWizard.exe** and change its permission to "Permit All". If it's not in the program list, use the **Add** or **Program Scan** buttons to find it.

3. On the **Networking** page, manually add 1U4500 IP address (i.e. `192.168.1.100`) to the **Trusted** list.

Replacing Damaged Hard Drives

If you are using RAID 1, RAID 5, RAID 6, or RAID 10, you can easily replace a damaged hard drive in the Thecus 1U4500 while keeping your data secure with the system's automatic data recovery.

Hard Drive Damage

When a hard drive is damaged and data in the RAID volume, the system LCD will display warning message also the system beeps.

Replacing a Hard Drive

To replace a hard disk drive in the 1U4500:

1. Remove the tray with the damaged hard disk.
2. Unscrew the damaged hard disk and remove it from the tray.

3. Slide a new hard disk into the tray and fasten the screws.

4. Insert the hard disk tray back into the 1U4500 until it snaps into place. You can also lock it with a key if desired.

5. The LED blinks green when the HDD is accessed.

RAID Auto-Rebuild

When using RAID 1, 5, 6, or 10 on the 1U4500, you can use the auto-rebuild function when an error is detected.

1. When a hard disk fails the system beeps and/or an email notification is sent to specified receivers.

2. Check the LCD to see which disk has failed.

3. Follow the steps mentioned above to replace the failed hard disk.

4. The system automatically recognizes the new hard disk and starts the auto-rebuild sequence to resume its status before the hard disk crash.

Chapter 8: Troubleshooting

Forgot My Password

If you forget your password, you can reset the unit to use the default password. To do this, press the reset button on the front panel after system is booted, and 1U4500 will be reset. WAN IP address will become `192.168.1.100` and admin password will be `admin`.

Forgot My Network IP Address

If you forget your network IP address and have no physical access to the system, you can find out the IP address by either looking directly onto the 1U4500's LCD panel, or by using the setup wizard to retrieve the IP of your 1U4500.

1. Start the Setup Wizard, and it will automatically detect all Thecus IP storage products on your network.

2. You should be able to find the IP address of the 1U4500 which you have forgotten in the **Device Discovery** screen.

Resetting NAS IP Address and Admin Password

In case you changed the 1U4500 IP address and then forgot it, or forgot the administration password, follow the steps below to reset to default settings:

1. Power on the 1U4500 till system ready and press the ***Reset*** button while buzzer with long beeping approximately 3-5 seconds. (The reset button is right below power button)

2. This resets the 1U4500 to its default IP address and password settings.

   Default IP: `192.168.1.100` for WAN and `192.168.2.100` for LAN
   Default admin password: `admin`
   Jumbo Frame support: `disabled`
   HTTP Port: 80, HTTPs:443

Can't Map a Network Drive in Windows XP

You may have problems mapping a network drive under the following conditions:

1. The network folder is currently mapped using a different user name and password. To connect using a different user name and password, first disconnect any existing mappings to this network share.

2. The mapped network drive could not be created because the following error has occurred: **Multiple connections to a server or shared resource by the same user, using more than one user name, are not allowed.** Disconnect all previous connections to the server or shared resource and try again.

To check out existing network connections, type `net use` under the DOS prompt. You may refer the URL below for more network mapping information.

http://esupport.thecus.com/support/index.php?_m=downloads&_a=viewdownload&downloaditemid=57&nav=0

Restoring Factory Defaults

From the **System** menu, choose the ***Factory Default*** item and **the Reset to Factory Default** screen appears. Press ***Apply*** to reset the 1U4500 to factory default settings.

WARNING Resetting to factory defaults will not erase the data stored in the hard disks, but WILL revert all the settings to the factory default values.

Problems with Time and Date Settings

The administrator is able to select an NTP Server to keep the 1U4500's time synchronized. However, if the 1U4500 can not access the Internet, you may encounter a problem when setting the Time and Time Zone. If this happens:

1. Login to the Web Administration Interface.
2. Navigate to ***System*** > ***Time***.
3. Under **NTP Server**, select ***No***.
4. Set the **Date**, **Time**, and **Time Zone**.
5. Click ***Apply***.

In addition, if the 1U4500 is able to access the Internet and you want to keep the NTP Server clock.isc.org by default, please make sure the DNS Server is correctly entered, thereby allowing the NTP Server name to correctly resolve. (See ***Network*** > ***WAN*** > ***DNS Server***)

Appendix A: Product Specifications

Hardware Specifications

Product Model	**1U4500R**	**1U4500S**
Core Processors / Memory		
Processor	Intel® Celeron™ M 1.5GHz	
Memory	512MB standard	
Network Interfaces		
LAN 1	Gigabit RJ-45 connector	
LAN 2	Gigabit RJ-45 connector	
Storage		
HDD Bays	4 x 3.5” SATA II HDD, hot-swappable	
HDD Support	SATA II HDDs up to 1000GB	
eSATA	1 x eSATA connector for capacity expansion	
I/O Interfaces		
USB Ports	3 x USB type A ports (Host mode) 1 x USB type B ports (Client mode)	
System Information		
LCD Control Panel	For basic configurations and status display	
System LED Display	4 x LED (System Busy, Power, Network Activity x 2)	
Physical		
Form Factor	1U rackmount	
Height	44.0 mm	
Width	430.5 mm	
Depth	567.6 mm	
Power Supply	250W redundant power supply 100~240V AC, 50/60Hz	200W power supply 100~240V AC, 50/60Hz
Environment		
Temperature	0 ~ 40°C	
Humidity	20 ~ 85% relative humidity (non-condensing)	
Certifications	CE, FCC, BSMI, C-Tick, RoHS Compliant	

Software Specifications

Network File Protocols	Microsoft Networks (CIFS/SMB) Apple Filing Protocol (AFP 3.1) Network File System (NFS v3) File Transfer Protocol (FTP) Hyper Text Transfer Protocol (HTTP) Secure Hyper Text Transfer Protocol (HTTPs)
Authentication	Local User Account Microsoft NT Domain Controller (PDC)* Microsoft Active Directory Authentication (AD)*
Network Client Type	Microsoft Windows NT/2000/XP/2003/Vista Unix/Linux/BSD MAC OS X/9/8.6
Network Configuration	Fixed IP address Dynamic IP address 802.3ad based failover and link aggregation
Disk Management	Disk status monitoring (S.M.A.R.T.) Disk idle spin-down
RAID	RAID 0, 1, 5, 6, 10, and JBOD Supports multiple RAID modes – users can create multiple RAID volumes with different RAID levels in one system Auto rebuild Hot swappable Hot spare Disk roaming RAID level migration RAID expansion
iSCSI Target	Supports: Microsoft iSCSI Initiator v2.0.4 StarPort Initiator V3.5.2 MAC OS: globalSAN iSCSI initiator version 3.0 (1150) Linux: open-iscsi 2.0-865
Folder Management	Share folder level permission File level permission Public folder
Quota Management	Share folder quota control
Backup	Thecus Backup Utility (Windows XP/2000 and MAC OS X) Thecus Nsync
System Management	Web GUI Multilingual support (English, French, German, Italian, Traditional Chinese, Simplified Chinese, Japanese, Korean, and Spanish) NTP support Wake-on-LAN Scheduled Power On/Off
Event Notification	Email notification Buzzer notification LCD
UPS Support	UPS monitoring via RS-232 and system shutdown on low battery

Printer Server	USB Printer (IPP support)
Supported USB Devices	USB Printer External HDD/flash disk USB IEEE 802.11 b/g dongle w/AP mode support**
Setup Utility	Windows 2000/XP/2003 MAC OS X

*PDC/AD support: Works as a client member in a Microsoft NT 4.0 domain/Active Directory domain, allowing the 1U4500 to utilize the domain users and groups setting for authentication to the system and authorization to the share folders.

**For supported USB dongles, please contact sales@thecus.com

Appendix B: Customer Support

If your 1U4500 is not working properly, we encourage you to check out **Chapter 8: Troubleshooting**, located in this manual. You can also try to ensure that you are using the latest firmware version for your 1U4500. Thecus is committed to providing free firmware upgrades to our customers. Our newest firmware is available on our Download Center:

http://www.thecus.com/download.php

If you are still experiencing problems with your 1U4500, or require a Return Merchandise Authorization (RMA), feel free to contact technical support via our Technical Support Website:

http://www.thecus.com/support_tech.php

Customers in the US should send all technical support enquiries to this email address:

support-us@thecus.com

For Sales Information you can e-mail us at:

sales@thecus.com

Thank you for choosing Thecus!

Appendix C: RAID Basics

Overview

A Redundant Array of Independent Disks (RAID) is an array of several hard disks that provide data security and high performance. A RAID system accesses several hard disks simultaneously, which improves I/O performance over a single hard disk. Data security is enhanced by a RAID, since data loss due to a hard disk failure is minimized by regenerating redundant data from the other RAID hard disks.

Benefits

RAID improves I/O performance, and increases data security through fault tolerance and redundant data storage.

Improved Performance

RAID provides access to several hard disk drives simultaneously, which greatly increases I/O performance.

Data Security

Hard disk drive failure unfortunately is a common occurrence. A RAID helps prevent against the loss of data due to hard disk failure. A RAID offers additional hard disk drives that can avert data loss from a hard disk drive failure. If a hard drive fails, the RAID volume can regenerate data from the data and parity stored on its other hard disk drives.

RAID Levels

The Thecus 1U4500 supports standard RAID levels 0, 1, 5, 6, 10, and JBOD. You choose a RAID level when you create a system volume. The factors for selecting a RAID level are:

- Your requirements for performance
- Your need for data security
- Number of hard disk drives in the system, capacity of hard disk drives in the system

The following is a description of each RAID level:

RAID 0

RAID 0 is best suited for applications that need high bandwidth but do not require a high level of data security. The RAID 0 level provides the best performance of all the RAID levels, but it does not provide data redundancy.

RAID 0 uses disk striping and breaking up data into blocks to write across all hard drives in the volume. The system can then use multiple hard drives for faster read and write. The stripe size parameter that was set when the RAID was created determines the size of each block. No parity calculations complicate the write operation.

RAID 1

RAID 1 mirrors all data from one hard disk drive to a second one hard disk drive, thus providing complete data redundancy. However, the cost of data storage capacity is doubled.

This is excellent for complete data security.

RAID 5

RAID 5 offers data security and it is best suited for networks that perform many small I/O transactions at the same time, as well as applications that require data security such as office automation and online customer service. Use it also for applications with high read requests but low write requests.

RAID 5 includes disk striping at the byte level and parity information is written to several hard disk drives. If a hard disk fails the system uses parity stored on each of the other hard disks to recreate all missing information.

RAID 6

RAID 6 is essentially an extension of RAID level 5 which allows for additional fault tolerance by using a second independent distributed parity scheme (dual parity) Data is striped on a block level across a set of drives, just like in RAID 5, and a second set of parity is calculated and written across all the drives; RAID 6 provides for an extremely high data fault tolerance and can sustain two simultaneous drive failures.

This is a perfect solution for mission critical applications.

RAID 10

RAID 10 is implemented as a striped array whose segments are RAID 1 arrays.
RAID 10 has the same fault tolerance as RAID level 1.
RAID 10 has the same overhead for fault-tolerance as mirroring alone. High I/O rates are achieved by striping RAID 1 segments.
Under certain circumstances, RAID 10 array can sustain up to 2 simultaneous drive failures

Excellent solution for applications that would have otherwise gone with RAID 1 but need an additional performance boost.

JBOD

Although a concatenation of disks (also called JBOD, or "Just a Bunch of Disks") is not one of the numbered RAID levels, it is a popular method for combining multiple physical disk drives into a single virtual one. As the name implies, disks are merely concatenated together, end to beginning, so they appear to be a single large disk.

As the data on JBOD is not protected, one drive failure could result total data loss.

Stripe Size

The length of the data segments being written across multiple hard disks. Data is written in stripes across the multiple hard disks of a RAID. Since multiple disks are accessed at the same time, disk striping enhances performance. The stripes can vary in size.

Disk Usage

When all 5 disks are of the same size, and used in RAID, 1U4500 disk usage percentage is listed below:

RAID Level	Percentage Used
RAID 0	100%
RAID 1	20%
RAID 5	80%
RAID 6	60%
RAID 10	50%
JBOD	100%

NOTE RAID 10 allows only 4 disks and one as spare disk.

Appendix D: Active Directory Basics

Overview

With Windows 2000, Microsoft introduced Active Directory (ADS), which is a large database/information store. Prior to Active Directory the Windows OS could not store additional information in its domain database. Active Directory also solved the problem of locating resources; which previously relied on Network Neighborhood, and was slow. Managing users and groups were among other issues Active Directory solved.

What is Active Directory?

Active Directory was built as a scalable, extensible directory service that was designed to meet corporate needs. A repository for storing user information, accounts, passwords, printers, computers, network information and other data, Microsoft calls Active Directory a "namespace" where names can be resolved.

ADS Benefits

ADS lets the 1U4500 integrate itself with the existing ADS in an office environment. This means the 1U4500 is able to recognize your office users and passwords on the ADS server. Other major benefits ADS support provides include:

1. Easy integration of the 1U4500 into the existing office IT infrastructure

   The 1U4500 acts as a member of the ADS. This feature significantly lowers the overhead of the system administrator. For example, corporate security policies and user privileges on an ADS server can be enforced automatically on the 1U4500.

2. Centralized user/password database

   The 1U4500 does not maintain its own copy of the user/password database. This avoids data inconsistency between the 1U4500 and other servers. For example, without ADS support, an administrator might need to remove a specific user privilege on the 1U4500 and each individual server. With ADS support, the change on an ADS server is known to all of its ADS members.

Appendix E: UPS Compatibility List

Brand	Series	Model	Notes
Ablerex	MS-RT		
ActivePower	1400VA		
AEC	MiniGuard UPS 700 M2501 cable		
APC	Back-UPS Pro		
	Matrix-UPS		
	Smart-UPS		
	Back-UPS	940-0095A/C cables, 940-0020B/C cables, 940-0023A cable	
	Back-UPS Office	940-0119A cable	
	Masterswitch Not a UPS - 940-0020 cable		
	Back-UPS RS 500 custom non-USB cable		
Belkin	Regulator Pro serial		
	Resource		
	Home Office	F6H350-SER, F6H500-SER, F6H650-SER	
	Universal UPS	F6C800-UNV, F6C120-UNV, F6C1100-UNV, F6H500ukUNV	
Best Power	Fortress (newer)		
	Fortress Telecom		
	Axxium Rackmount		
	Patriot Pro		
	Patriot Pro II		
	Patriot INT51 cable		
	Micro-Ferrups		
	Fortress/Ferrups f-command support		
Centralion	Blazer		
Clary	ST-800		
Compaq	T1500h		
Cyber Power Systems		320AVR, 500AVR, 650AVR, 700AVR, 800AVR 850AVR, 900AVR, 1250AVR,. 1500AVR, Power99 550SL, 725SL, CPS825VA, 1100AVR, 1500AVR-HO	
Deltec	PowerRite Pro II		
Dynex	975AVR		
Effekta	MI/MT/MH 2502 cable		
Energy Sistem	(various)		
ETA	mini+UPS WinNT/Upsoft cable		
ETA	mini+UPS PRO UPS Explorer cable		
Ever UPS	NET *-DPC		
	AP *-PRO		
Ever-Power	625/1000		
Exide	NetUPS SE		
Fenton Technologies	PowerPal P-series		
	PowerPal L-series		
	PowerOn		
	PowerPure		
Fairstone		L525/L625/L750	
Fideltronik	Ares 700 and larger		
	Other Ares models		

Brand	Series	Model	Notes
Fiskars	PowerRite MAX		
	PowerServer	10, 30	
Gamatronic	All models with alarm interface		
	MP110/210		
	MS-T		
	MS		
	µPS3/1		
Gemini	UPS625/UPS1000		
HP	R3000 XR		
	R5500 XR		
INELT	Monolith 1000LT		
Infosec	iPEL	350, 500, 750, 1000	
Ippon	(various)		
Liebert	UPStation GXT2 contact-closure cable		
Masterguard	(various)		
Meta System	HF Line	1..4 boards, /2 5..8 boards	
	HF Millennium	810, 820	
	HF TOP Line	910, 920, 930, 940, 950, 960, 970, 980	
	ECO Network	750, M1000, M1050, M1500, M1800 M2000, M2100, M2500, M3000	
	ECO	305, 308, 311, 511, 516, 519, 522	
	ally HF	800, 1000, 1250, 1600, 2000, 2500	
	Megaline	1250, 2500, 3750, 5000, 6250, 7500, 8750, 10000	
MGE UPS SYSTEMS	NOVA AVR 600 Serial		
	NOVA AVR 1100 Serial		
	Pulsar Ellipse	USBS Serial cable, S, Premium USBS Serial cable, Premium S	
	Ellipse Office	600 Serial cable, 750 Serial cable, 1000 Serial cable, 1500 Serial cable	
	Pulsar EXtreme C / EX RT		
	Comet EX RT	Serial port, 3:1 Serial port	
	Pulsar Esprit		
	Evolution S	1250, 1750, 2500, 3000	Serial Port
	Pulsar M	2200, 3000, 3000 XL	Serial Port
	Pulsar	700, 1000, 1500, 1000 RT2U, 1500 RT2U, MX 4000 RT, MX 5000 RT Evolution, EXtreme C, ES+, ESV+, SV, ESV, EX, EXL, PSX, SX, Extreme	Serial Port
	Comet EXtreme		
	Comet / Galaxy (Serial)	Utalk Serial Card (ref 66060), HID COM Serial Card (ref 66066)	
MicroDowell	B.Box BP	500, 750, 1000, 1500	
Microsol	Solis	1.0 1000VA, 1.5 1500VA, 2.0 2000VA, 3.0 3000VA	
	Rhino	6.0 6000VA, 7.5 7500VA, 10.0 10000VA, 20.0 20000VA	
Mustek	Various		
	Powermust	400VA Plus, 600VA Plus, 800VA Pro 1000VA Plus, 1400VA Plus, 2000VA USB	
Nitram	Elite	500, 2002	
Oneac	EG/ON Series advanced interface		
Online	P-Series		
OnLite	AQUA 50		
Orvaldi	various not 400 or 600		
Powercom	SMK-800A		
	ULT-1000		

Brand	Series	Model	Notes
Powercom	TrustTrust 425/625		
	BNT-1000AP		
	Advice Partner/King Pr750		
	BNT-2000AP		
PowerGuard	PG-600		
PowerKinetics	9001		
PowerTech	Comp1000 DTR cable power		
Power Walker	Line-Interactive VI1000		
Powerware		3110, 3115, 5119, 5125, 5119 RM, PW5115 PW5125PW9120, PW9125, 9120, 9150, 9305	
Powerwell	PM525A/-625A/-800A/-1000A/-1250A		
Repotec	RPF525/625/800/1000		
	RPT-800A		
	RPT-162A		
SMS (Brazil)	Manager III		
SOLA		325, 520, 610, 620, 330	
SOLA/BASIC Mexico	various ISBMEX protocol		
Socomec Sicon	Egys 420 VA		
Soltec	Winmate 525/625/800/1000		
Soyntec	Sekury C	500, 800	
SquareOne Power	QP1000		
SuperPower	HP360, Hope-550		
Sweex	500/1000 smart - shipped with SafeNet		
	500/1000 contact closure - shipped with UPSmart		
	BC100060 800VA		
Sysgration	UPGUARDS Pro650		
Tecnoware	Easy Power 1200		
Tripp-Lite	SmartUPS		
	SmartOnline		
	(various) Lan 2.2 interface - black 73-0844 cable		
Trust	UPS 1000 Management PW-4105		
UNITEK	Alpha	500 IC, 1000is, 500 ipE	
UPSonic	LAN Saver 600		
	Power Guardian		
Victron/IMV	(various)		
	Lite crack cable		

NOTE

- The UPSes marked Blue have been tested and work well
- If your UPS is not in the support list, be sure that the UPS supports one of following protocols:
  - SEC protocol
  - Generic RUPS model
  - Generic RUPS 2000 (Megatec M2501 cable)
  - PhoenixTec protocol
  - Safenet software

Appendix F: Licensing Information

Overview

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Source Code Availability

Thecus Technology Corp. has exposed the full source code of the GPL licensed software. For more information on how you can obtain our source code, please visit our web site, http://www.thecus.com.

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- This product includes software developed by Eric Young (eay@cryptsoft.com).
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c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

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